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Child-Study.

The Journal of the Child-Study Society.

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H. Holman, M.A.

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Child-Study.

The Journal of the Child-Study Society.

The object of the Society is the Scientific Study of the Mental and Physical Condition of Children, and also of Educational Methods, with a view to gaining greater insight into Child-nature and securing more sympathetic and scientific methods of training the young.

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Child-Study.

The Journal of the Child-Study Society.

RECREATIONAL ACTIVITIES OF GIRLS DURING ADOLESCENCE.

By Mrs. M. SCHARLIEB, M.D., M.S.

A Paper read before the London Society, January 26th, 1911.

"Life is a skill, an art like a handicraft, and true knowledge is a form of will."

I have been asked to read a paper on the recreational activities of adolescent girls, and before commencing I must define the scope of my paper. I take it that what is expected of me is not a discourse on recreational activities in general, but on such recreational activities as involve chiefly muscular movements, I am to exclude such activities as are primarily, or chiefly, intellectual.

But with regard to the other factor in my subject, adolescent girls, I propose to consider the young girl, whether she be the fortunate child of well-to-do parents, the elementary schoolgirl, or the poor little waif who has been mercifully brought into an institution, whether that institution be reformatory school, hospital, or even prison.

The human body is a marvellous trinity in unity, consisting, so far as we know, of body, soul, and spirit. In the earlier ages of the history of mankind the activities, whether industrial or recreational, were chiefly *physical*. The men had perforce to hunt, to fish, to fight, in order to maintain existence. The woman was chiefly charged with agricultural and domestic duties, hence no doubt the specialization of certain forms of work to each sex; a specialization which, when the race became sufficiently leisured to have time to play, was represented in the games and pastimes peculiar to each sex. It is little wonder then that in the early days the play of men and boys consisted generally of games of strength, skill and prowess, reminiscent of, and

developed from, his normal activities; on the other hand, the games and pastimes of girls and women were chiefly derived from their primary pursuits, and took the form of make-believe shopkeeping, of home industries (including needlework, weaving, etc.), and the cares of a family as exemplified in the cult of dolls, a cult which goes right back through the long ages to the children of prehistoric and bygone races. More and more the pastimes of the young tended to specialize, until, some hundred years ago, it was considered absolutely outrageous that girls should play any game chiefly involving the use of muscles, and mainly dependent on accuracy of aim, quickness of eyesight, and general alertness. What would our grandmothers have said to girls playing cricket, golf, and hockey? The result was the production of the early Victorian maiden, whose mother was not contented unless she had pretty manners, unruffled hair, and spotless garments, which resulted in general incapacity. Of course, even in those days there were exceptions, and some women and girls, all honour to them, braved the public opinion of their time, and were classed as hoydens and tomboys.

As a natural outcome of these views the physique of our grandmothers suffered very considerably. Mental development of a sort was pressed, but physical development was neglected, and it is not too much to say that their natures developed in a rather lop-sided manner. Then came the reaction, a reaction the force of which is not yet entirely spent.

The idea which *still* exists in the minds of many young people, and even in some of their elders who ought to know better, is that girls should be trained into being somewhat inferior boys rather than into what is perhaps the most admirable work of God, "the perfect woman, nobly planned," whose triune nature has received such adequate cultivation as results in symmetrical development. To many of us who are deeply interested in the welfare of the race, who work and pray for better times, it is quite evident that the girl's education and recreation were not right as things were one hundred years ago, nor are they right as they now are, but we hope and believe that we see the dawn of light, and we are anxious for more light for ourselves, for more light for the instructors, and for the children of our nation. I am entirely putting aside all question of special intellectual and spiritual recreation and development. I am thinking for the moment entirely of the *physical* side of the girl's nature, and want to consider with you briefly what methods there are of bringing their bodies to the highest possible degree of perfection, and also to consider which of these methods are possible for us at the present time.

Among the well-known agents of physical culture we must rank gymnastics, athletics, dances, and games. Gymnastic activities were well known and very successfully practised in the ancient world, but in them girls and women, except in Sparta, had a very inadequate share. We know that gymnastic exercises were of so high consideration amongst some of the nations of antiquity that they acquired a quasi-religious significance. We modern English men and women ought to recognize that the influence of gymnastics on the human body tends towards righteousness. It is old knowledge that we should seek for the *mens sana in corpore sano.*

From a delightful book, "The Schools of Hellas," we learn that "The girls at Sparta were also organized into agelai, or packs. They took their meals at home, but otherwise lived a thoroughly outdoor life. They had to train their bodies no less than the boys, in order that they might bear strong children, so they took part in contests of strength as well as of speed. They shared in the gymnasia and in the musical training. Among their sports were wrestling, running, and swimming. They were exposed to sun and dust and toil. They learned to throw the diskos and the javelin; they wore only the short Doric 'chiton' with split sides. They went in procession at festivals like the boys; at certain festivals they danced and sang in the presence of the young men, praising the brave among them and jeering at the cowards. . . . The result of all this outdoor training was great physical perfection; Lampito, the Spartan woman, in Aristophanes' 'Lusistrata,' is greatly admired by the women from other cities for her beauty, her complexion, and her bodily condition: 'she looks as if she could throttle a bull.' She ascribes it to her gymnastics and vigorous dancing. The girls, till they married, wore no veil, and mixed freely with the young men; in fact, there was one dance where they met in modern fashion: first the youth danced some military steps, and then the maiden danced some of a suitable sort. Consequently love-matches were far more possible at Sparta than elsewhere in Hellas. After marriage the women had to wear veils, and remained at home; gymnastics, dancing, and races ceased."

The Greeks held that weakness was akin to wickedness, and ugliness to sin. They believed, and they rightly believed, that a beautiful and strong body was at any rate likely to be the home of a pure and lovely soul. During the middle ages gymnastics, as such, suffered an eclipse, for although not entirely set aside, their place was filled, so far as men were concerned, with the exercises of chivalry which found their highest expression in the "very parfait gentill knighte." Later on, Hahn, Ling, Turner, and many others revived public interest in

gymnastics, and each had his special method whereby he sought to develop the muscles and nerves, to relax tension, to cultivate a bold and enterprising spirit, and to quicken the interest of healthy young people in their bodies and in their bodily powers. Pictures, statues, measuring tapes, scales, and weights, in fact, the whole paraphernalia of anthropometry, were called into play, competitions were arranged, and a great spirit of emulation was evoked.

All this at first concerned men and boys only, but we are beginning to recognize that it equally concerns girls and women, and no one can watch the pupils in the great Central Institutes of Sweden and Denmark, or those in the various institutions in England, without admiring the strength and suppleness of their most wonderfully trained and disciplined bodies, nor could they overlook the even more important good effects on the mental and moral constitution of the girls. The old German words, "Frisch, frei, fröhlich, fromm," leap to one's mind when watching the graceful and daring evolutions of these young gymnasts. Advantages can be claimed for several different systems of gymnastics, the more ready applicability of free-standing exercises counterbalancing to some extent the greater value of gymnastics carried out with apparatus.

Although we are now to some extent aware of the necessity of physical culture for our girls, we still lag very far behind such comparatively small and poor nations as Denmark and Sweden in the provision made for gymnastic exercises in our schools and colleges for girls and women. We have no right to be content with what we have done until there is a large, well-ventilated, and well-equipped gymnasium attached to each school, college, and institution.

The recreational activities of girls as represented by athletics have had probably quite as difficult an initial period as the gymnastics. It has only lately been recognized that swimming, rowing, running, bicycling, and the infinite variety of team games, such as cricket, net ball, croquet, tennis, hockey, and golf, are as suitable for women as for men. Riding, the queen of athletic exercises, and archery, were always considered ladylike, but unfortunately were beyond the reach of the majority of young girls.

All athletic exercises may be considered good both for body and mind, but more especially may grand results be expected from the proper and wise use of those games which specially need co-operation. Such games as cricket, hockey, net or basket ball are particularly useful, not merely because they cultivate the bodily framework, quickness of sight, alertness, and intelligence, but still more because, when played according to rules, and *in the right spirit*, they are most potent

agents in developing rectitude, fairness, obedience, and unselfishness—in one word, they tend to develop in girls those generous qualities that we most admire, and that constitute to our insular pride the characteristics of the true Englishman. The qualities that girls are supposed to lack, especially a corporate sense of honour and corporate unselfishness, are those qualities which are bound to develop when team games are played in the proper spirit.

In order that athletic games should be properly played, it is necessary that there should be at least one really well-qualified games mistress or instructor in a school, college, or institution. The qualities that go to make up an efficient and capable instructor are manifold. There must be an adequate knowledge of the subject taught; there must be a combination of such qualities as enthusiasm, good judgment, impartiality, tact, and alertness of intellect. Unless the instructor has a genuine love for the game, and is, or has been, an accomplished performer, she may, indeed, enunciate the rules, but her teaching will be lifeless and dead. Unless her impartiality and good judgment are beyond criticism she will fail to secure the willing obedience and cheerful co-operation of the pupils; and unless she is blessed with that combination of sympathy and common sense which we call "tact," all her other excellent qualities will go for nothing, for she will fail to seize the psychological moment and to say and do the right thing at the right time. Such instructors may not be easy to find, but the serious point is that they are very seldom sought. Until those who have the charge of growing girls recognize the supreme importance of their games—an importance I do not hesitate to say at least equal to that of their lessons—so long those who have supreme control, excellent, conscientious, and hard-working though they be, will fail to select the right person for the most difficult post in their school.

There has been hot discussion as to whether the best instructor is to be found in a specially appointed games mistress or in one or more of the form mistresses of a school. There is, of course, much to be said on both sides, but those who advocate the employment of form mistresses as instructors in gymnastics and athletics, contend that the influence they are able to bring to bear upon their pupils in school is greatly enhanced by the knowledge that the pupils have acquired of their excellent qualities in the gymnasium and on the playing-field. We all argue from the known to the unknown, and the girls who have proved the mistress's thoroughness, enthusiasm, and honour in the subjects that they do understand, are likely to trust her better in the moral and intellectual training of which they themselves have little knowledge.

The next group of recreational activities to which I shall allude comprehends dancing, music, and singing. Most young people delight in dancing, partly from the physical exhilaration caused by the quickened circulation, but partly because all unconsciously the movements express the fundamental passions, sentiments, and occupations of the race. From the history of the dance we know that its rhythm and movements, frequently accompanied by appropriate song, has been connected with all manner of occupations—with the work of the mower, the woodcutter, and the sailor, with the rhythmic movement of the flail, with "the shout of them that triumph, the song of them that feast." Nor are rhythmic movements and rhythmic songs limited to helping in the expression of primitive joys and sorrows of old-time occupations. The Lancashire operative hears a melody in the whirr of his loom, and has expressed it in quaint, rhythmic movements of the hands and arms wedded to a few uncouth words. The dance is also intimately associated with military processions, with civic functions, and with religious ceremonies; not only did David dance before the ark, and the saltatory priests in the temple of Jove, but to this day in the cathedral of Seville the priests and ministerial attendants solemnly dance before the altar in Holy Week.

How different from the dances redolent of the occupations and of the loftiest sentiments of mankind are the languid and purposeless movements of many modern dances. The mazurka, the polonaise, the minuet, and the cotillon are well-nigh things of the past, and in many a so-called dance the chief and almost the only exercise is a dreamy and somewhat indolent waltz. Language has been described by Dean Alford as "fossil poetry," and the folk-songs and country dances of a nation are in many instances illustrations of pages in its history.

Dancing, like all other good gifts, may be wasted and misapplied. What should stand for the nutrition and perfection of body and mind may only too easily degenerate into opportunities of injuring the one and corrupting the other; but because some unfortunate people pervert and spoil a blessing there is no reason for us to despise it, but an ever stronger call to rescue it from its degradation, and to raise it to its true uses. One of the prettiest, and at the same time most pathetic, sights of London and other great cities is that of little children dancing on the pavement to any chance music, such as that furnished by an Italian organ-grinder or a vagrant fiddler; the little ones know instinctively what is for their good, and ever throw themselves into it with a grace and verve that even their anæmic frames and tattered clothes cannot conceal.

When I was in Sweden I remarked to one of the elderly gymnasium

mistresses that the somewhat mechanical movements taught in the classes gave the girls a stiff and angular carriage. She replied with much acumen, "Yes, girls who have learnt gymnastics may be stiff, but the girls who have never learnt them are horrid." Undoubtedly the stiffness or angularity of movement possibly occasioned by too great devotion to gymnastics may be admirably counteracted, and their benefits supplemented by dancing. Of this, our friends, the Swedes, seem to be well aware, for now in all the larger elementary schools the most charming country dances are taught as a part of the school curriculum, and come at the end of the hour assigned to formal gymnastics, accentuating and increasing the benefits obtained.

Now surely it would seem a most ungracious task to question whether the results of games and gymnastics are of unmixed good, and yet it is quite certain that exercise carried to excess, or undertaken by unfit individuals, is likely to lead to disaster. Without at the moment going into medical details, one must claim not only that medical inspection and examination should *precede* physical training, but also that instructors and pupils alike should understand enough of the anatomy and physiology of the human frame to be able to pause in time, and to avoid deleterious excess.

In order that athletics, gymnastics, games, and dances should not only assume their proper place in the school curriculum, but also in order that they shall be adequately safeguarded, it is necessary to insist on a thorough physical examination of all children who are to practise them. There is a popular idea that any one can see which children are strong and which are delicate, and whether there is any temporary disability which should cause a relaxation of the usual routine. Such an idea is entirely unfounded. A child may be far from well; indeed, it may have organic disease of some important organ without exhibiting such symptoms as attract the attention of its parents and guardians. It is therefore absolutely necessary for the safety of all who are to engage in gymnastics and athletics that they should have a thorough and careful physical examination. The fear has been expressed that many parents would object to this examination; but undoubtedly if it were part of the accepted routine of the school, taken as a matter of course, there would be little or no parental opposition. Parents are usually very keen that their young people shall have an ample share in all the benefits of their school or college, and when the girls themselves realize that they cannot take their place in the school or college team until they have passed the doctor, they themselves will be the most ardent missionaries in the conversion of their elders.

In most instances it is advisable that the doctor should be a woman. There is nothing like setting a thief to catch a thief, and it is a matter of common knowledge that in many cases girls have said they would prefer a gentleman inspector because he neither saw so much nor did he ask such inconvenient questions. A well-trained and tactful woman will probably get to know more about the girl's health and her physical capabilities than would the wisest and kindest of men.

In arranging for the gymnastics, athletics, and games of girls, it is necessary to recognize that owing to physiological peculiarities they are not always equally fit for the fatigue and stress which are ordinarily amongst the greatest profits of the exercises. There are occasions on which girls should be required to stand out of the game, and when gymnastics, games, and dances are properly organized, and the school girls are divided up into teams or groups, each with their supernumerary or reserve members, it should be quite easy for the watchful instructor to arrange that those members who are not at their physical best should take necessary rest, and give the supernumeraries a chance of play. The spirit of obedience, camaraderie, and discipline, which ought to reign supreme in the gymnasium, playground, and dancing-hall, would, under proper guidance, very quickly make the girls themselves realize not only the injury to themselves occasioned by exertion at unsuitable moments, but also the detriment to their team and its work.

These considerations naturally lead on to those connected with competitions and inter-scholastic matches. As at present constituted one of the leading characteristics of girls and women is a spirit of emulation, and the desire for mere personal distinction. This, if carried to its logical conclusion is, if not a vice, at any rate a regrettable weakness in the feminine character, and needs to be carefully controlled and disciplined, so that girls and women may be led to care more for success in their corporate than in their individual capacity. With this object many authorities arrange that most of the games shall be practice games, that only a few inter-class competitions shall be held, and still fewer inter-scholastic and inter-collegiate. I do not mean for a moment that this element must be entirely suppressed, but I do mean that it should be carefully disciplined and controlled, and that girls should learn to love their athletic sports, games, and dances for the sake of the sports, games, and dances themselves, and not for the honour and glory that may thereby accrue to them individually.

I suppose there are few doctors who have not seen girls whose health has been impaired, and even some whose constitutions have

been injured, by an excessive and unwise devotion to athletics, whose nervous systems have been fatally damaged by the excitement and nervous exhaustion caused by the strain, not of the game itself, but of their excessive desire for victory. The evil effects of undue physical exertion, of games played by those who are too young, or too weak, to bear the strain, are not confined to temporary disablement or illness; in too many cases permanent damage is done, the over-taxed muscles deteriorate, and still more frequently the heart is both dilated and hypertrophied to such an extent that it is never again a healthy or a comfortable organ.

It appears, unfortunately, that the damage done by excessive athletics is not confined to the individual girls. There is reason to fear that it extends to the race. Doctors and school-mistresses observe that excessive devotion to athletics and gymnastics tends to produce what may perhaps be called the "neuter" type of girl. Her figure, instead of developing to full feminine grace, remains childish, or at most tends to resemble that of a half-grown lad; she is flat-chested, with a badly developed bust, her hips are narrow, and in too many instances there is a corresponding failure in function. When these girls marry they too often fail to become mothers, and it appears to be probable that even when blessed with children they are less well fitted for the duties of maternity than are their more feminine sisters. I do not wish to be misunderstood, undoubtedly the proper use of physical exercises tends in all ways to the improvement of the girl in body and in mind, it is only the excessive and injudicious abuse that is followed by these disastrous consequences.

We may perhaps take it that nowadays we are all anxious that young women should have gymnastics, athletics, games, and dances, that they should profit to the utmost by all opportunities that can be afforded to them for the perfection of body and soul. There is, however, a considerable doubt as to what games are profitable, and whereas the young people themselves are quite clear that hockey is a splendid game, and one that they all wish to play, we are beginning to hear from various heads of houses and school doctors that in many instances it is too strenuous and that they have been reluctantly compelled to forbid it. This seems a great pity, for undoubtedly hockey is one of the team games that tends to promote the corporate spirit, and to call into play all the muscles of the body. Is it not possible that mischief in hockey, and such other games, is caused by the endeavour on the part of girls and young women to play it under exactly the same conditions as do the men? Many people of experience tell us that for girls each side should play for at any rate five minutes less than do the men. It is

also certain that much of the harm which is said to be caused can be obviated by suitable arrangements. Girls should never play a strenuous and more or less exhausting game unless there are proper arrangements for changing, for a sponge-down, and for refreshment. For the same reason it is probably wise to limit inter-scholastic and inter-collegiate matches, to protect girls against the fatigue and exposure of railway journeys to and from matches, and from the undue excitement caused by, and the exaggerated importance that they are inclined to attribute to, their games.

It is difficult to say why boys and girls are different in this respect, but there is a distinct difference in the outlook of adolescent girls and boys on both lessons and games. Apparently the trouble at the root of this is the undue individualism of the one, and the somewhat phlegmatic indifferentism of the other. The boy undoubtedly can get up an enormous enthusiasm for the game of cricket or football, but after all, if his side loses he does not eat a less good supper, nor sleep less well; while the girl on the other hand sometimes feels as if for her the world had come to an end. I am inclined to think that the boy has it more or less "rubbed into" him that "the game's the thing," that victory is of less consideration than "playing the game," that when every one has done the best for his side, failure may be more creditable than success. I believe that if girls were imbued with these ideas and with wise guidance from instructors and heads of colleges, combined with a more judicious form of home sympathy, the girls' troubles will tend to right themselves in the course of a generation or two, meanwhile we must do what in us lies to prevent the girls of the present day from wrecking their constitutions and their happiness.

The little boy and girl before puberty are not unlike in figure, and to a certain extent have similar mental and moral endowments, but at the all-important epoch of puberty divergence is accentuated, and the girl rapidly specializes from the common neuter, or infantile type, to the feminine. For a time she grows more rapidly than her boy contemporary, her bust develops, her hips expand, momentous changes occur in the internal organs, in short, the child has become a woman. The boy develops later, and never in the same way or to the same degree. Their aims and objects in life should also specialize in unison with the specialization of their bodily nature. The destiny of the man is emphatically to be the breadwinner, the engineer, the soldier, the sailor, or the priest; the whole development and genius of the woman, on the other hand, is towards the perpetuation and conservation of the race, it is her sacred office to give to the nation its future citizens, to feed them, to nurture them, to teach them, to set them forth on the

race of life, and to at all times afford a loving and an adequate shelter to those of her children who return to her weary and worn with the battle of life. Let no woman say that her horizon is narrow or that her scope is limited, different it is indeed from that of her helpmeet, but who can say that the mothers of the race are the least important of its citizens.

And here let me say one word for a class of our girls and women of whom we seldom think in connection with athletics, with dancing, or with playing. I should like to draw attention to what are called "State Children," to the waifs and strays, to girls in reformatories, to women in prison. The majority of these are imperfectly developed in body, or mind, or both; their lives are intolerably drab, savourless, and wanting in all that ministers to joy and to nobility; they are our pariahs, and we treat them as such. It is true that board and lodging are provided, that attempts at instruction are made, and that even some very infrequent festivities may be vouchsafed, but how few think of teaching workhouse children, reformatory girls, and women prisoners to play games, to dance, or to sing, and yet they are people of like passions with ourselves, we own a common human nature, and those things that ennoble and develop our own daughters would have a powerful influence over those whose lives have been warped and spoiled not always by their own fault. I was much struck by the remark of a gentleman who recently went to Vancouver Island. He said, "There is no crime here, for there is ample work for every one." Is it then indeed true that civilization such as we know it is a great disease? Is it true that our centuries of improvement and of culture with our colossal manufactures and our magnificent engineering have resulted in the improvement of everything except of the race itself? Is it to be feared that alcoholism, insanity, and other plague spots on the body politic have been in some measure induced, or at any rate increased by our social system? If so, is it not the duty, and might it not be the joy, of those who love their country to try to reclaim rather than to punish, and that especially in the case of the young we should give to them such a vision of the possible beauty, order, and joy of life, as might make them in love with goodness, and help them at any rate to put away from them that moral obliquity which makes them such undesirable members of society, remembering always that in spite of occasional exceptions to the contrary, the *corpus sanum* is indispensable to the development of the *mens sana?* Having now considered the various methods of physical culture that are to be found in the recreational activities of young girls, let us equally briefly think of the services that may thus be rendered to the nation.

1. *Prophylactic.*—Much of the ill health and delicacy of girls and women in the past was due to their want of physical development. The lives of many young girls of the poorer classes are spent either in ill-ventilated and dirty rooms at home, or in schools where the element of ventilation at any rate is too frequently defective. The consequences of these influences are that the girls are anæmic, with feeble muscles, and faulty digestion, hence a plentiful crop of cases of gastric ulcer, and other diseases dependent on mal-nutrition. Things have improved enormously during the last thirty or forty years, but even now there is far too high a proportion of anæmic, feeble, weedy girls. The results of these conditions show themselves in many ways, to mention but a few, slight cases of lateral curvature of the spine are extremely common, in its more severe forms it occurs in a very considerable percentage. This is a trouble chiefly due to muscular weakness. At the approach of puberty the girl's bust develops, while frequently the muscles of her back remain small and inefficient, she is easily fatigued, and in consequence assumes wrong attitudes to relieve her weariness, she stands on one leg, sits with one leg crossed over the other, leans on one elbow when she reads, and sprawls sideways on her desk when she writes. The difference between boys and girls, say between thirteen and eighteen, has always been noticed, but it is only of comparatively late years that we have understood the reason for this difference. It is of course to be found in the different recreations traditional for boys and girls almost up to the present time. There is no lateral curvature in girls so long as their play and activity is equal to that of the boys, but with the advent of school age a difference in muscular strength begins to show itself, and in many young girls there is an inclination towards lateral curvature. This inclination becomes well marked after puberty, and the tremendous changes that puberty involves.

Many years ago Professor Liebreich noticed the frequent association of lateral curvature of the spine with errors of refraction, and he was led to the conclusion that errors of refraction were caused not only by errors in the shape of the eyes, but also, and perhaps even more, by the weakness of the muscles of the eyes, and the faulty attitudes that children assume when reading, writing, and sewing. It is a melancholy fact that the necessity for spectacles increases *pari passu* with civilization and education.

Once again, the headaches from which so many girls suffer are most frequently due to anæmia on the one hand, and to eye strain on the other, the very evils that are caused or aggravated by lack of fresh air, exercise, and suitable physical culture. The remedy for these evils and many others is to be found in the physical culture which invigorates

and brings to perfection muscles, nerves, and organs, and which supplies them all with an adequate amount of healthy blood.

2. *Remedial.*—Whether from the bad surroundings in the homes of the poor, or from excessive luxury and self-indulgence in the homes of the rich, there are still in our midst a large number of young girls whom we have failed to save from physical imperfections such as those mentioned above. Doctors, whose practice lies chiefly among women and children, have many patients with lateral curvature, errors of refraction, and more or less aggravated anæmia, with its consequences of chronic dyspepsia, palpitation, and general incapacity. For these girls there is scarcely any remedy so valuable as properly directed physical exercise; all the varieties of athletics, gymnastics, and games are of service in these cases, but they cannot be administered in the mass, as it is safe to do in ordinary cases. All these remedial agents require to be ordered with reference to the needs of each individual patient, and must be varied in amount from day to day with careful consideration of the patient's varying condition. Remedial exercises, such as we have learnt from Sweden, find one of their most profitable uses in the correction of spinal deformity, of flat feet, and anæmia and its consequences.

3. *Moral.*—The moral effects of physical culture are invaluable. All healthy exercise tends to the strengthening of self-respect, good temper, cheerfulness, and many other virtues, while the influence of team games, played under proper circumstances and in the right spirit, help to fit the woman to take her part in the serious business of life; they are likely to supply her with courage and endurance with which to meet her inevitable troubles and difficulties; they give her that ready adaptability to circumstance, the capacity for "give and take" which will fit her to be a good wife, or a desirable member of a school and college staff; the absolute necessity of unselfishly promoting the common weal at the cost of all personal distinction is bound to make the woman both valuable and beloved in the momentous concerns of home, or civic or professional life.

In conclusion, I would revert to one of my earliest statements that the human being consists, as far as we know, of spirit, mind, and body. Spiritual education—that is, the inculcation of religious and moral precepts—has been practised from all time, wherever a religious system or a moral code has existed. Education of the mind, or book-learning, has been given to the masses only within the last half-century, and then only in civilized countries. The education of the body, or systematic physical training, certainly existed in ancient Hellas, but the necessity of applying it to the whole youth of the nation has only been recognized within the last few years. Not only is this recognition far from

complete, but practice lags so much behind precept, and I want to insist that, while its recognition has come last, its importance is by no means least. I want to insist that, *as a rule*, we cannot have the *mens sana* unless we have the *corpus sanum*. I know there have been brilliant exceptions. I know that Nelson's feeble frame contained a heroic spirit, and that a saintly soul dwelt in the frail body of St. Francis of Assisi; but these were men of most exceptional moral force. I am sure that many men and women fail in the battle of life, not because they are wanting in morality or learning, not because the spirit is not willing, but because the flesh is weak. Feeble physique means less energy—less strength to work and less strength to resist temptation. The flagging flesh seems to need the whip or the spur, and resort is often had to drink or to drugs. I repeat that spiritual, mental, and physical training are all necessary, and should go hand in hand, that the last is not the least, and that the last can and should be doubly useful by being made the means of developing the mental and moral as well as the physical sides of the human being.

That physical training is necessary for *men* is now more or less completely realized, but I want to insist that it is, if possible, more necessary for women. In the first place, a man has no calls on his physique other than those incidental to his work or to illness; whereas a woman has those and others peculiar to her sex. In the second place, it is a physiological fact that women have more to say to the making of posterity than have men.

Physical training, therefore, means more strong men and women to do noble or profitable work, and fewer feeble persons to fail in the struggle for existence; it means more good work and better work, less breakdown, less temptation, less vice, less misery, less insanity, and less pauperism.

I believe that every one of us has a mission in life, and is immortal until he has definitely failed in or has accomplished his task; and I believe this to be equally true of the nation. Ours is a people which has been commissioned to carry the lamp of light and learning to the uttermost ends of the earth, and it will neither fail as long as it is worthy, nor cease while ought remains to be done. That we may be worthy, it behoves us to perfect the spirit, mind, and body of every man and every *woman* of our imperial race.

A CASE OF APPLIED CHILD STUDY.

By Professor and Mrs. EARL BARNES.

In all parts of America during these past few years children, singly or in groups, have been stricken down by infantile paralysis. As the dread disease passes on it leaves behind a terrible harvest of human wreckage. Few physicians even have had experience with the after effects of this scourge, and parents often face it in despair. We have been working for the last seven years to correct the effects of this disease in our little daughter; our conditions have been singularly fortunate and the results have been full of encouragement. It is in the hope of helping some parent with less experience, that we have written this description of the case. We have no panacea to offer, and we cannot take the place of expert medical and orthopedic advice; but possibly we can strengthen the courage of some one starting on the long process of restoration.

M. was born on December 10, 1901. She had grown into a strong healthy child and was running about everywhere, when, on June 21, 1902, she was stricken with infantile paralysis. That summer was very warm in West Philadelphia, where she was living; and a number of other cases developed in the vicinity during the following weeks.

None of the conditions which often precede such attacks were present in her case; she had not been overheated, nor had she any sudden lowering of temperature through sitting on a cold step, lying on the grass, or taking a cold bath. About noon she was seized with vomiting, followed by high fever, and the family physician was called in. This disease had seldom been correctly diagnosed at that time; and our physician, though a man of wide experience, had never met a case of infantile paralysis; he treated the child for gastric fever.

The fever continued high for some days; the body became painfully sensitive to the touch; and often the child lay with head drawn tensely back, suggesting spinal meningitis. For a time it seemed doubtful if she would recover, and then she came slowly back to normal temperature, but weak and seemingly labouring under utter exhaustion. Her whole body was limp and helpless. Even then, neither physician nor parents suspected the truth.

On July 10, the mother carried the child to Chautauqua, N.Y.,

where the father was then engaged, and for two weeks more she was kept out of doors and treated with tonics, until she could sit propped up in a perambulator and could use her arms a little. Then she was taken to two resident physicians who at once pronounced her case infantile paralysis. It was the first time we had ever heard the name, and it filled us with terror. We have emphasized this period because it was five weeks after the attack before we even suspected the real trouble, and this shows how ignorant and unprepared we were to meet the problem of M.'s after treatment.

At that time Mr. Jacob Bolin, a man trained in the best traditions of Swedish gymnastics in Stockholm, was directing a school in Chautauqua. To his profound knowledge of anatomy, his scientific common sense, his skill in massage, and still more his ingenuity in devising special exercises, we owe an obligation which can never be paid. For a month he gave M. frequent massage and exercises, and trained the mother so that she was able to massage the feet, legs, and back effectively. This home treatment was persistently kept up every two hours during the waking time of the first year.

For six years we had frequent examinations and advice from Mr. Bolin; but he has now, to our deep regret, moved to Colorado. We shall avoid mentioning the names of other experts we have consulted, as we have no desire to condemn nor to advertise individuals, but since Mr. Bolin is not available for consultation, we take this opportunity to express our profound gratitude to him.

From the first, Mr. Bolin urged that the child should be led to put forth every possible effort in moving the legs and feet along some simple selected lines. There can be no doubt that if this is too long neglected, memories of movements formerly used will tend to fade out of the mind and a habit of helplessness will be formed. There can also be no doubt that effort energizes nerve centres and prepares them for greater efforts. As strength returned to the right leg the child was encouraged to exercise it in various ways, such as drawing it up while lying on her back. To aid this particular movement, she was put in a bath, where the water floated the weight of the leg and made the movement easier. Afterwards less water was used, until finally she could draw the foot up on the wet bathtub alone and then on a bed. This is but an illustration of the hundreds of little exercises devised to call into play some unused or imperfect muscle.

It is hard to imagine a more difficult educational problem than this: How can you make a little girl of eighteen months want to turn her foot so as to hit a red ball held half an inch away? This problem is infinitely complicated by the fact that at first she cannot move her

foot at all, and that when she begins to move it, you must repeat the exercise hundreds of times. In this drill everything depends on the co-operation of the child. A ready intelligence, a happy temperament, and a naturally persistent will, count for much; and if properly handled, the drills and exercises will react on mind, disposition, and will so as to greatly develop and strengthen them in turn.

In M.'s case her natural qualities were helpful, and her treatment has always been a series of plays. The right leg has been "Jack" and the left leg "Jill"; and they have gone through a thousand stirring adventures in which slightest wiggles have aroused feelings in watching generals which charging regiments of cavalry could hardly have evoked. It is doubtful if any other motive except parental love can sustain one's courage through years of this indispensable drill.

With the return of more vitality to the right leg, Mr. Bolin suggested that a baby jumper be procured for M. This consisted of a circular hoop of wood, three or four inches in diameter, and about three feet across, resting on casters, and with strong wooden upright rods supporting a smaller wooden hoop above. These supporting rods were lengthened so that the upper hoop fitted under M.'s arms and her dangling feet just touched the floor. At first she was pushed about; then she pulled herself by a string fastened to some object, until finally she was able to push a little with her right foot. Not having to sustain her weight, her legs naturally sought action, and from dangling came in time to pushing her about. This simple, mechanical aid was used for months with excellent effect.

From Chautauqua, M. was taken to a country home where there were other children a little older than herself. Here, from rolling about the floor, she began to creep. Imitation of the other children, who got down and crept with her, did much to sustain her courage. Playing with a normal child is of great value in all of these cases. From this time on, M.'s desire to get things and do things led to much spontaneous effort; and it was very hard to stand quietly by and not rob her of these opportunities. All of one's natural instincts led one to rush to her assistance, or at least to minimize her difficulties, while judgment said, "Increase them." It is always difficult to let a child learn by doing and take his chances of tumbling or meeting other dangers that may follow. When the child is disabled, it is doubly hard, and the heart of the parent drives her to rush forward and do the thing which the child needs to do for his own cure.

One day in particular, when the child wanted some flowers, the mother, holding them, slowly retreated through a long hallway and down some steps into a yard, the child toiling laboriously after her,

crying and indignant, but finally receiving the flowers in triumph. She had not only exercised all of her muscles to their full capacity, but she had also proved her ability to get what she wanted by her own efforts. Such treatment is hard for the child, and tenfold harder for the mother, but that way lies the only hope.

On returning to Philadelphia, M. was taken to the leading specialist in the city, a man who had a wide experience in such cases. He gave the child a critical examination, advised continued massage and exercise; and when pressed for a judgment of the future, said, "It is a bad case; if she ever walks, she will walk very badly." Yet notwithstanding this expert judgment, she can now, after seven years' continual treatment, walk miles, without a brace, and with only a comparatively slight limp. This simply illustrates what persistent treatment, continued through a long period, can do.

Since then we have taken her to see the best specialists in America and England; and while their judgment and advice is indispensable, their prognosis is never infallible, and their decisions of hopelessness never close the door of possibility. It may also be of interest to parents of moderate means to know that in all of our experience with specialists we have found that a frank statement of our financial conditions, made in advance of examination, has secured the best of service for a very reasonable fee.

During the following weeks home exercises were kept up, and a woman came three times a week for massage and treatment with faradic electricity. In the autumn M. had a period of home treatment with galvanic electricity, and in the following summer it was continued for a time. The authorities we have consulted have held various views as to the value of electricity, and our own fragmentary experience has given us no sound judgment as to its effects.

For four months we had seen no sign of movement in the left foot. Galvanic tests indicated no probability of returning control, but negative evidence proves nothing to a mother. One day in October, 1902, while rubbing the foot before the fire, she saw a faint flickering downward movement of the great toe. May all who work and watch over their children have such an experience. To-day M. can flex all her toes of that foot downward pretty strongly.

Mr. Bolin had warned us that there would be some atrophy in the left leg, and that after a little deformities would begin to appear. All orthopedic surgeons seem to agree that infantile paralysis does not produce contractions in any part of the body. It does, however, leave some parts so weak that the weight of the body upon them overstrains these parts, and leaves others unstrained, until contractions become

fixed. Abnormal movements, which must come when normal movements are cut off, emphasize these contractions. This may produce club foot, distorted pelvis, spinal curvature, sway-back, or knock-knees; the knee, instead of projecting forward, may project backward, producing back-knee; and a hundred lesser deformities may creep in.

An intelligent father or mother can find great comfort and hope, entirely justified by the facts, if he realizes that these consequences are not the direct results of the disease, but that they creep in very slowly through subsequent growth and the effort to regain control of movement. Thus a skilful anatomist can anticipate these developments, and through massage, special exercises and braces can combat them and minimize their evil effects.

In the late autumn of 1903 we moved to New York, and in January, one year and six months after the attack, M. who for some weeks had been able to stand when holding on to some object, began walking short distances. In consequence of this new activity the left foot turned outward, back-knee began to appear; and these defects were so marked that massage and exercises could not correct them.

On Mr. Bolin's advice we took M. to see a leading neurologist in New York. He had been a close student of this disease for years, had written extensively concerning it, and we felt that he could probably see further ahead than any one else we could consult. He gave her a careful examination, and when pressed for prognosis said he thought there would be complete or partial recovery, except in the muscles that lift the left foot. This prediction has proved correct. He suggested, as possibly helpful, a strychnine tonic and the use of galvanic electricity. We tried both of these suggestions, but after a time, seeing no beneficial effects, they were discontinued.

He also felt sure that a brace should be provided, reaching the length of the left leg. On his recommendation, we went to an orthopedic surgeon in New York, who took the measurements, planned apparatus, and had it executed by a skilled mechanician. The brace went inside the shoe, came up on either side of the leg, and buckled around the waist. At first it was clumsy and disagreeable, but it soon became fairly comfortable, and not only corrected deformities for which it was planned but doubtless hastened effective walking. Special shoes were also made by a surgical shoemaker under the same direction. This surgeon was at the time doing some remarkable work in muscle grafting, but in reply to our inquiries, he held out little hope that M. could be benefited by any surgical operation, as there was no large body of unaffected muscle available in the left leg below the knee.

In the spring of 1904, we moved to England and made our home there for three years. We have gone into these details of our wandering life because they explain how we came to consult specialists in so many different places. It would be unfortunate if we gave the impression that we went about from place to place in the hope of finding some phenomenal cure. In this disease, it is especially desirable that there should be continuous treatment under the same leadership through months and years.

Mr. Bolin had advised a tricycle, and a friend in London gave one to M. It was a strong machine, built low, and for months M. was pushed about the quiet pavements of old Queen Square every morning, seated in the tricycle, with her feet tied to the pedals. This exercised the leg muscles, thousands of times over, always in normal planes, and the beneficial effects were marked.

In June, 1904, shortly after reaching London, we took M. to see a specialist who had spent his life in the study of paralysis. He gave her a careful examination, spoke highly of her past treatment, and for the future advised a new brace, fitted to her increased growth, with continued massage and exercises. He thought sea-bathing would be decidedly advantageous, and for two summers M. was taken to the seashore with beneficial effects.

The London physician also suggested that horseback riding would be good for M., as she would be constantly led to grip the saddle with her knees, thus calling into play muscles not reached by ordinary exercises. About this time we went down into the country to live, and a donkey was procured, and provided with a convenient blanket saddle, on which M. rode almost daily for two seasons. This exercise was most helpful.

Several people gave M. massage in England, generally three times a week. Her mother filled in the intervening days, and often repeated the rubbing several times a day. Drill and ordered exercises were also kept up. Of course, at times there would occur short periods of neglect; but they were infrequent, and were offset by renewed activity when the cause for the interruption had passed. It is doubtful if hired service, no matter how conscientious, would have kept up the constant treatment when, sometimes for weeks at a time, little or no improvement could be seen.

In 1905 the right foot, which had seemed almost entirely restored, broke down under the strain of double work, and a bad case of flat foot developed. To correct this M. was taken to a shoemaker who made a speciality of such cases. He made her a pair of shoes, the right one provided with an arched metal insole. The foot did not

respond to this treatment, and, as the brace had become too small, we took M. to an orthopedic surgeon, who made a brace for the right foot, coming up past the ankle, and buckling around the shin; a new brace was also made for the left leg, but instead of coming up to the waist, it buckled around the upper thigh.

During the last two months of our stay in England M. was taken to a very able Swedish masseur for daily treatment. He had a gymnasium fitted for special cases, and paid great attention to exercises planned to call particular muscles into play. Special exercises on a ladder, and others where graduated weights helped defective muscles to lift the foot, were repeated day after day, following massage. Great emphasis was laid on strengthening the abdominal muscles by lying on the back and lifting the feet, or by holding the feet down and raising the head.

This masseur urged us to abandon the brace, as it interfered somewhat with circulation and prevented full freedom of action. Our orthopedic surgeon urged us to continue it to correct some defects in knee and ankle, and still more to insure against strains, which in a weak limb could be corrected only with great difficulty. This question of braces has been one of the most difficult we have had to settle. Sometimes they are so clearly needed that every one must recognize the fact, and sometimes it is obvious that they are unnecessary. In doubtful cases orthopedic surgeons and instrument makers are apt to over-estimate their value, while those dealing with massage and exercises underestimate them. This is one of the places where the parent's own judgment must decide between rival opinions.

When we returned to America, late in 1906, Mr. Bolin found M.'s condition very satisfactory, except that there was some shortening of the left leg. To correct this, he advised using the vibrator. This is a rapidly revolving rubber disk, driven by a small electric motor. It was applied especially on the long bones of the left leg, at the points of growth, near the joints. The shortening process was stopped, and we are inclined to believe that the vibrator helped in stimulating growth.

Some spinal curvature developed shortly after, and, as an aid in correcting it, Mr. Bolin suggested that we place a false bottom in the chair M. used at table. This was simply a piece of board, with a cleat three inches thick under one side and two inches thick under the other. This slanting seat, by lifting one hip, doubtless aided in correcting curvature; but exercises and massage did more.

For the next two years, M. was treated three times a week by a skilful Swedish masseur who brought to his work not only knowledge and skill but also ability to secure the child's hearty co-operation. He

was her good friend; and while he held her to exact and careful drill, he introduced into the work a spirit of comradery which made his coming always more than welcome. In this respect we have always been fortunate, and M. has never dreaded taking her treatment nor going to see a specialist.

During this last period, M. has spent her summer months at the seashore where she has been much in the water and has learned to swim. In the summer vacations, massage has been generally discontinued; and for a year past she has worn no braces. All who are now advising us agree that she is better off without them, and will probably never need them again.

M.'s present condition makes us feel that our efforts have met with remarkable success. If neglected, her feet would have turned over, producing some form of club foot; the left leg would have been greatly shortened, while pelvic displacement, curvature of the spine, and more or less derangement of the nervous system and vital organs would have followed. Difficulty in getting about would have affected her general health, and possibly her disposition.

As it is, she weighs seventy-five pounds, while the average for her age is fifty-eight pounds. She is fifty-four and one-half inches tall, the average for her age being forty-nine inches. She is in perfect health, and quite unconscious that she is in any way handicapped. Her back is perfectly straight; and her defect is limited to her left leg, and is almost entirely below the knee. The leg is seven-eighths of an inch shorter than the other, but, with a curved metal instep under the foot, it is only one-quarter of an inch, which means that the bones of the leg have shortened only that amount. There has been no failure in this leg to keep up its growth during the past two years. The muscles that flex the left foot upward have never shown any signs of returning power, and so the foot drops a little, causing a limp, which becomes marked when running. She, however, walks miles, swims, and plays nearly all the games that children of her age can play.

Conclusion.

Our object in describing this case has been to help parents who are facing the after effects of infantile paralysis. It is possible that the multiplied details, the repeated discouragements and slow progress, our journeyings about and our seemingly unlimited command of expert advice, with the still incomplete recovery of M., may at first discourage the reader rather than hearten him for the long and inevitable struggle that lies ahead. As the months pass, however, and he re-reads this case he must find encouragement in its every step.

Moreover, the journeyings and numerous specialists are an accident of our lives and probably have been on the whole unfavourable to recovery. Mr. Bolin, who first took up the case, advised us from time to time to see specialists for our own comfort. Their judgments in every case confirmed what he had already told us, and if we had followed his directions alone from the first, and he had remained available for consultation, the results would probably have been as they are, or even better. In such a long process of recovery it is doubtless best that one man of special knowledge and good judgment should be continued in charge of the case for the sake of his cumulative knowledge of its development.

In these cases it is probable that tonics, medicines, or drugs can be of little help in aiding recovery of the affected nerve centres. The general health is, of course, very important; but to overcome the effects of the paralysis, we must depend on massage, exercise, and corrective braces. Concerning the effects of electricity we have no right to an opinion.

Massage is indispensable. In most cases the parents must prepare themselves to give a great deal of the rubbing; and almost any masseur can, with a few lessons, enable them to do this pretty well. They will need, however, to have their work supplemented from time to time by an expert whose knowledge of anatomy and skill in manipulation will enable him to reach the deeper muscles, work out contractions, and waken unused nerve centres. Even among reputable masseurs, there is great difference in knowledge and skill; and the child should be taken occasionally to a first-class man, even if only two or three treatments can be afforded, that the parents may have their attention directed to any new developments.

Exercises devised to fit the special case are, we believe, quite as essential as massage. These must be repeated again and again with care and precision, and yet with sympathy and tact which will secure the hearty co-operation of the child. Sea bathing from time to time seems helpful; and sea salt in the bath at home has a good effect on these muscles.

When braces are needed to prevent or cure deformities they must be provided; and it seems better to us to be guided by a skilful physician rather than by that of an instrument maker or a masseur alone. There are also many home-made devices, which an ingenious parent will invent to relieve strains and aid recovery. He must remember, too, that the poor circulation in affected parts leaves them cold, and special wrappings are desirable to aid circulation, especially where braces are used. This point is often overlooked by specialists, and needs the parent's constant attention.

The co-operation of the child is all-important. He should be made as little as possible conscious of his defects, and should be urged to undertake everything he can possibly do with other children, or by himself. He should never recognize himself as a cripple, nor look upon his defects as permanent. He can easily be led to see that every one has some defect, and that all life is a struggle away from imperfections. A sunny, affectionate atmosphere, created by parents and attendants, will do more to correct weakness than any amount of scientific treatment administered in a perfunctory or harsh spirit.

This disease generally attacks several children in the same community, and it is as likely to appear in the country-side, or in small towns, as in the city. Thus groups of parents must often confront its ravages at a distance from expert help. Common suffering, growing out of like calamity, and community of interest, should give rise to effective co-operation in those cases. Since the disease attacks the rich as well as the poor this sympathy and co-operation may often give to the children of the poor advantages which they could not have if they were alone in misfortune. Once a year, or oftener, a specialist might be brought from the city to serve all alike. Then a masseur might come, once a week at least, to treat the children and train the parents, so that they can carry on the massage and exercises during his absence.

Finally, while there is no probable cure in most of these cases, there is possibility of improvement in all of them; and this improvement, in details or as a whole, may come so close to a cure as to be virtually the same thing. Even when a case has been long neglected, our experience warrants us in believing that distinct improvement will follow persistent treatment. Nowhere in the long process of recovery is there any place to stop, nor any reason to be discouraged.

SYSTEMS OF PHYSICAL TRAINING FROM THE STANDPOINT OF CHILD STUDY.

By Miss K. G. CASH, B.A.

Most systems of physical training, whether of gymnastic exercises or of manual work, have suffered either from regarding the body as separable from the mind, and therefore as capable of being educated apart, and for its own sake, or from ignoring the emotional springs of human activity, with the result that the exercises they advocate have no relation whatever to those springs.

As in learning to write the child was practised in making never-ending meaningless pothooks, so in learning to use his limbs he is exercised in making endless and equally meaningless arm, leg, and trunk movements. In the first case, the teacher's aim is to produce skill in the manipulation of the pencil, and a knowledge of the form of the letters of the alphabet. In the second, it is to produce accurately-performed movements of parts of the body, and promptitude in the execution of these. Both are supposed to have some kind of occult disciplinary value, probably based upon the fallacy that true discipline depends upon making children do the things they do not like to do, and, therefore, in opposition to their will.

But when we realize that the purpose of education should be preparation for life, and that life is not in the least like anything to be found in the ordinary schoolroom, just because it is not fragmentary, nor formal, as the work of the school too often is, and when we realize that success, in the best sense of the word, depends upon interests such as demand complete co-operation of the will, it is evident that the primary consideration in regard to physical exercise for children is as to what exactly they like to do. That is to say, we are brought back once more to the need for throwing upon one side all theories which are not based upon the study of the nature of the child. Now, the child is not interested in the development of his body for its own sake. It is true that the adolescent may become so, and may voluntarily go through a course of training for this purpose, but he does so always under the influence of an idea. It is, therefore, never a mere meaningless series of movements such as the physical exercises of the school too frequently are.

If we look for a moment at the chief systems of physical training, one or other of which has a place in our schools, we shall find, I think, that all of them neglect the interests and purposes of the child, and substitute those of the adult. Such systems are those of Jahn, Ling, the Swedish system, and perhaps we might add the military system, which has been advocated recently as a desirable form of physical training for boys. Jahn viewed the body as a mechanism, and aimed at making this mechanism so efficient that it would act with precision on any occasion. In order to make it wholly adequate to meet emergencies, he thought it desirable to exercise certain muscles, or other parts of the body, which were not normally called into play. This could only be done by an effort of will on the part of the child, and by this means Jahn believed the will might be trained.

But the body is not a mechanism in any sense of that term. It is a living organism; and although it is possible for many of its movements to be carried out in relatively automatic fashion, yet it is perfectly

evident that these are always within the range of conscious life, and never wholly independent of it. It is consciousness that sets going a series of habitual movements, consciousness that recognizes its conclusion, or detects any obstacle that threatens to interfere with the series. And, further, it is consciousness which sets the movements going, under the influence of an idea. Now it is true that in Jahn's system, the boy who is required to exercise a muscle not usually exercised, would act under the influence of an idea. He would have to fix his attention upon that part of his body, and try to exclude from his attention every other part. But when he has done this, what exactly has he gained? Practically nothing, because for him there has been no purpose in the action which has meaning or interest.

The Ling system is not much better than that of Jahn, except, perhaps, that it does not set out by viewing the body as a mechanism. Dr. Stanley Hall describes its aim as that of forming a position as opposite as possible to that of the embryo. The embryo is curled up, and this position is suggestive of weakness and inactivity. The opposite position suggests strength as compared with weakness, and the aim is, therefore, to produce a braced, buoyant, and alert attitude. The Ling system recognizes that such an attitude has an influence upon the mind, and that the braced body aids the development of self-respect. But it is surely quite as true to say that the state of the mind very largely determines the attitude and movements of the body. A drooping posture characterizes the despondent child; a springing gait, the movement of the happy and normally self-confident one. It is true that bad posture and lack of physical activity are very frequently indications of ill-health, or of too rapid growth; but it is also true that the indications of health and normal growth are good posture and physical activity. It would therefore seem that the Ling system of exercises is unnecessary, provided the child is normally developed, and has interests which absorb him, and which he has the opportunity to follow.

An advocate of the Swedish system, speaking recently upon the subject of physical exercise, prefaced his remarks by saying that gymnastics were a kind of medicine, and served the purpose of correcting the evils likely to follow upon two or three hours of sitting, and possibly stooping, over work in school. But why should we settle down to the belief that our children must necessarily require medicine of this kind? If the result of our school organization is to produce such a physical state in our children, should we not at once take steps to sweep away that organization, and with it the need of medicine? What is the business of the teacher but to provide such conditions in the school that the child can grow normally? But suppose we cannot

immediately alter existing conditions which we know to be bad, is it quite certain that formal gymnastics are the best means of counteracting the evils? Is it quite certain that the children need medicine? Do they not rather need food? If gymnastics are to be described as a kind of medicine, may we not describe the free spontaneous movements of children in dancing or games as food? Medicine the child takes because he must; food because he desires it.

Exponents of the Swedish system lay great stress upon its value in drawing into activity the mind as well as the body. Music is discarded, and to some extent rhythm, because it is believed that both detract from the value of the exercises as mental discipline. In my opinion, this is one of the chief drawbacks to the system, and is an illustration of the mistaken conception of mind, and its connection with the body, referred to above. Rhythmic movement is one of the great needs and great delights of childhood. It is, moreover, a racial heritage, and therefore instinctive in character. It is the poetry of movement and finds its most complete expression in dancing. But dancing requires the accompaniment of music, and it is just this combination of rhythmic movement and music that gives it its charms. The emotional feeling of childhood and adolescence finds its best expression in dancing and in play. But emotion is not to be regarded as divorced from ideas, and as some vague and indefinite feeling: It is dependent upon thought or perception, and is rather to be regarded as the driving force which gives rise to the expression suggested by thought. It cannot be said that any of the systems of physical training mentioned above take any account whatever of this emotional feeling, which after all is the most important thing in human life. Who ever saw a child in the street going through a series of Swedish exercises for the sheer delight of it? But who has not seen the immediate effect of a barrel organ, like that of the Pied Piper, upon children in its neighbourhood? What is the life of youth for, but for joyous expression? But nobody ever saw such expression as the result of a formal drilling lesson. After all, it is formality that kills. If we must have formality we might at least reserve it for maturity, or old age, but not inflict it upon our children.

There has been some attempt in recent years to introduce a form of military training into boys' school. Whether this is to be attributed to fear of the Germans, or to a real desire to do the best for the children, it is difficult to say. But one advantage it would certainly have over other systems, provided the possibility of a future German invasion, or of other disasters was kept prominently before the boys—the drill would have a meaning. Yet it seems to me that there are two very important objections to this form of drill. In the first place, in

order to give it meaning it would be necessary to cultivate a jingo spirit wholly undesirable. In the second place, it would involve a form of specialization for adult ends, and this is not legitimate from the point of view of child study.

Besides this, as the method of military training would be that of teaching boys to act with promptitude to command, and little else, it is doubtful whether it would have any real intellectual or moral value. We are not required in our lives, either as children or adults, to act with the unquestioning obedience of soldiers. We are rather called upon to act with thought and judgment, selecting our means to accomplish our purpose. It is in exceptional rather than in usual circumstances that military training would be found to have real value.

The alternative to all these systems is not far to seek. All we have to do is to observe the instinctive activities of children outside the school, to study those to be found in the past life of the race, and to base our educational systems upon these. That is to say, we must alter our mode of procedure in selecting material for the education of children. We must follow the lead of the child, rather than require the child to follow our lead. This does not necessarily mean that there will be no control, direction, or education of the spontaneous activities of childhood on the part of adults. It does not mean that our schools or playgrounds will be transformed into bear-gardens. But it means that the teacher, having learned from children something of their needs and desires, will utilize these, and through suggestion primarily, will aid the children in giving them shape, and in bringing them into harmony with their developing intelligence, and gradually increasing insight into life and its meaning.

Human life is essentially social. It is through our relationships to other human beings that we become capable of self-realization; it is through these same relationships that we become aware of the meaning of sacrifice, whether for a cause, a country or a friend. Our acutest suffering, and our deepest joy, either of which carry us into the very heart of life itself, are experienced through our social relationships. And, if we turn to the life of childhood and adolescence, we shall find that the first steps are being taken, primarily through means of play, towards the understanding of these relationships. The essential characteristic of a child's play is that it has a meaning, and a more or less conscious purpose. It is the expression of instinct modified by developing thought. It is essentially social, for by its means the child gives expression to his ideas of human activity and human relationships. It is for these reasons that play is a form of activity far surpassing in educational importance any system of exercises devised by adults.

But, in my opinion, play is not to be regarded merely as a form of recreational activity, and so, as an activity belonging primarily to the playground or street, and to the school merely in the form of organized games. The play-impulse governs the life of childhood, and, very largely, that of adolescence. It is the chief mode of spontaneous expression, which is the great asset of youth, and which, if teachers and parents only realized it, is their best friend and most faithful ally in bringing about that which they have most closely at heart, the welfare of their children.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Physiological Psychology and Education.—"Many recent advances in psychology are directly due to physiological observations; for example, our knowledge of the complex processes involved in the use of language has been very greatly increased by the study of lessons of the different parts of the brain concerned in these processes and of the effects of such lessons, and many other examples might be cited. The phenomena of sleep, fatigue, and disease, the mental effects of drugs and of injuries to the brain, the slow development and decline of mental power with the development and decay of the nervous system in youth and in old age respectively, cannot be in any sense understood or explained save by reference to the nervous system, and they prove conclusively that our mental life is intimately bound up with, and to a great extent conditioned by, the processes of the nervous system, and therefore cannot be understood without the aid of the knowledge of those processes. It is just these features of our mental life of which a thorough understanding is most urgently needed, because it is with these that the educator and the physician are concerned, and it may be confidently predicted that psychology will cease to be regarded as a purely academic study, and will be recognized as providing the only sound theoretical basis for the art of the teacher and the practice of the alienist in proportion as it becomes a truly physiological psychology." —*Dr. W. McDougall*, "Physiological Psychology" (Dent's 1*s.* series).

Games for Defectives.—"The more the children play the better. Organized games are good. In England football and in America base-ball are great stand-byes. Great value, however, is to be attached to games that the children devise for themselves. They should be given chances to play freely and follow out their own plans. Where possible a piece of ground in which they can grub round without doing themselves or other people any harm is a great advantage. It is pleasant

to see little gardens growing up in corners of the playground. It may be sad that they should be the sort of gardens which belong to a much younger age normally, but it is so good that they are there at all. Skipping, ball-games, hoops, kite-flying are all good. Horses, with reins made from any ends of strings that the children can find, are excellent. Such reins are far better than the pretty ready-made ones that are given so kindly at Christmastide. It is better for the child to be prompted by his desire to play horses to look for or beg string himself than to have all his wants supplied. In their games especially the delight of the feebleminded child in accomplishing something is apparent. It ought to be encouraged to the utmost degree."—*Miss Mary Dendy*, "Feeblemindedness in Children of School Age," by *C. Paget Lampage*, M.D., M.R.C.P., and *Mary Dendy*, M.A.

Physical Training.—Dr. Stanley Hall enters a strong protest against machine-made physical training in the *Pedagogical Seminary* for December, 1910. He says, "A captain, coach, or trainer dictates diet, sleep, regimen, and perhaps lays down the moral code, so that the modern gladiator's part is not to reason why, but to do or die. . . . He robs the athlete of the very best lessons of his discipline, viz. bodily self-guidance, the attainment of a physiological majority which comes with the competence to care for one's bodily self. The supreme problem of the academic athlete is to solve his own personal hygienic problem, which is always and for every one an original investigation on which his success or failure in life will largely depend. His problem is how to get the very most and best out of his own physique. To this end, he must carefully observe himself in rest, in fatigue, when full or hungry, when growing lean or fat, and learn the great lesson of being the steward of his own body, developing power to resist sloth and appetite or overstraining in himself. This alone can give him true self-knowledge and self-control. At the very most, he should be only allowed access, when in doubt, to a medical adviser, who might now and then help him towards solving the problems that in the last analysis must always be his own. . . . The great body of experimental data on the effects of training, use, disuse, fatigue, rest, and every hygienic and dietary research in our laboratories that sheds light upon the muscle and nerve culture should be collated. . . . Such a compend as I am demanding would be a veritable Bible for athletes. It would instil honour, temperance, the simple life, the spirit of loyalty to larger wholes even than the *alma mater*."

NOTES.

A Play Number.—As the subject of Play is being very widely discussed just now, it was proposed to give this number over almost entirely to that subject; but owing to the fact that certain papers which it was hoped would be available have not come to hand, this has been impossible. Our next number may possibly be a play number.

A Debate Night.—The debate on "Should Games be Organized," at the meeting of the London Society, on February 9, proved very attractive. Miss Nuth opened for the affirmative view, and Dr. Hayward followed for the negative view—or rather for a qualified affirmative view. There was then a free and vigorous discussion. The members of the large audience appeared to enjoy the proceedings very much.

"Notes" Wanted.—For the third time honorary secretaries, and others, are asked to send contributions for this section of the journal. Otherwise it cannot but be mainly a London Society affair. Is it quite hopeless to ask for co-operation?

Professor and Mrs. Earl Barnes's Article on the treatment of their own daughter for infantile paralysis is the reproduction of a little booklet which they have issued, and are willing to send to any who apply to them for it, at 3640, Chestnut Street, Philadelphia, U.S.A. It has a very special value in that it deals mainly with some of the physical elements of our nature, which, it is too often forgotten, have an essential and high function in our life as a whole, and therefore in relation to mental life. It will also have a very special interest to most of our readers because of its authors.

Child Study in India.—Mr. A. C. Bose, of Calcutta, who is a member of the London Society, in acknowledging the receipt of copies of *Child Study*, says he thinks "they will be very serviceable to us. Here in India there is ample opportunity and scope for child study, only workers are needed. Let us hope we shall get workers in the course of time. Meanwhile we hope to receive advice, suggestions, and assistance from your Society in opening the field here."

Miss Ravenhill in Canada.—Miss Ravenhill writes: "I took a few days off to accept the hospitality of the Women's National Council at Vancouver and Victoria, where wonderful receptions were given to me, and the kindest welcome. I spoke on Child Study at both places, and aroused the keenest interest."

CORRESPONDENCE.

Co-Education.

Sir,—May I crave a few lines of your space to suggest that the subject of Co-Education has not yet received the attention it deserves from our Society? I am aware that some discussion thereon took place at the annual conference at Tunbridge Wells last year; and that the paper read at the conference by Mrs. Ussher for Mr. John Russell, of the King Alfred Schools, was published in our *Journal*, July, 1910.

At the beginning of his very interesting paper Mr. Russell tells us that his children "number at present some seventy boys and girls, of ages varying from seven to seventeen," but he does not tell us how many of his *boys* are more than fourteen or fifteen years of age. Now, with much diffidence I venture to submit, sir, that this is

the important point : Should young people be educated together between the ages of fourteen and twenty-one ?

A symposium on Co-Education would probably reveal far greater differences of opinion on this, the crux, than on any other part, of the whole question of Co-Education.

Possibly, sir, you could see your way towards starting a discussion on this subject, or a course like the one we have recently had on Recreation.

I am, Sir, yours obediently,

BERESFORD KINGSFORD (M.D., etc.).

Upper George Street, W.

[Discussion is invited.—ED.]

REVIEWS.

Kindergarten: Zeitschrift für Entwickelnde Erziehung. Oehmigke, 64, Zimmerstr., Berlin.

This brightly written kindergarten journal, published monthly, bears on its cover the portrait of Fröbel, and closely resembles our English *Child Life.* Poems and quotations suitable for school use are contributed by various lady teachers, and the various developments of the Fröbelian propaganda inside and outside Germany are narrated from month to month. Lengthy reports of the Magdeburg meeting of the Fröbel Union form the chief item in the March number (1910) which lies before us.

F. H. H.

The Dawn of Character. By EDITH E. R. MUMFORD, M.A. Longmans, Green & Co. 3*s.* 6*d.*

This book is evidently written more especially for mothers, nursery governesses, and others responsible for the training of young children who have had little systematic instruction in child psychology and allied topics. The problems dealt with are those of the home and nursery rather than the school, for although such topics as the Growth of Imagination, the Law of Habit, the Development of the Will, and the Place of Punishment in Education are as important for the teacher as the mother, yet these are discussed here in their home aspects rather than in their school application. The treatment of these and other matters is somewhat discursive, and wholly untechnical, yet based upon such sound principles as are to be met with in William James's "Talks to Teachers on Psychology," or Sulley's "Studies of Childhood." The style is fluent, interesting, and quite simple. There is plentiful illustration of the rules and principles enumerated by means of stories of nursery experiences. These stories are not of unusual or extraordinary children, but are such as can be duplicated out of any mother's record of her own children, and for that reason are more likely to be helpful. The book should aid those readers for whom it is intended in the solution of the many perplexing problems that daily beset the anxious trainer of children under ten years of age—problems that in isolation seem of small account, and yet are all significant when set in relation to the important end of right and wise control of the child.

S. Y.

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Child-Study.

The Journal of the Child-Study Society.

THE EXPERIMENTAL STUDY OF GENERAL INTELLIGENCE.

By CYRIL BURT, M.A.,
Lecturer on Experimental Psychology in the University of Liverpool.

An Address delivered to the Manchester Child-Study Society, October 22, 1909.

General Intelligence is a difficult thing to define. It is still more difficult to prove that it exists. Most difficult of all is the discovery of a simple means of measuring its amount in the individuals who possess it.

With physical characteristics, measurement is easy. There are measuring rods for measuring stature, and weighing machines for measuring body-weight; if these are used with proper precautions, and applied under standard conditions, the measurements obtained are highly reliable, and in respect of them we may compare different individuals, different sexes, different races, and even different generations. The soundness of a person's heart or kidneys, eyes or ears may be ascertained with ease by means of recognized tests. Such tests and such measurements are widely used in the inspection of candidates for the merchant service, recruits for the army, and applicants for insurance policies, and so forth. They have been elaborated by a long process of scientific research, and are now carried out by professional experts employing technical methods and special apparatus.

Physical efficiency is thus a thing which we have already learnt to value and to measure. Mental efficiency is surely as valuable as physical efficiency, and its measurement certainly constitutes a far more neglected problem. Both in our theories and in our practice it is of the utmost importance to be able to sum up an individual's mental

capacities; yet we have no recognized test by means of which to standardize our observations, or reduce them to numerical precision, or make them independent of the particular opportunities or disadvantages in learning or in training peculiar to the individual tested.

Of all mental measurements, the most valuable would be one which would represent the general resultant of his abilities as a whole. For the practical purposes of everyday life we are continually comparing children or adults on the ground of general mental capacity. This boy, we say, is extremely dull, that boy extremely bright; this girl is stupid, that girl is sharp; Tommy is rather more clever than Jack; and the rest are merely of mediocre ability. This we do, assuming that every one concerned will understand without further definition the phrases we use. We specify neither what the individuals are brilliant at, nor how they have acquired their brilliancy. And thus implicitly we postulate a scale of natural brilliancy at things in general, a scale which is supposed to be the common property of all who have to deal in ready and rapid estimates of their fellow-men, a scale along which boys and girls, men and women can all be ranked with rough exactitude.

The mental function, measured by this scale and vaguely thus conceived, has acquired a special designation. It is termed General Ability, or, more commonly, General Intelligence.

There are, however, problems bigger than the problem of the individual pupil or the individual workman, which also involve the same conception—educational and social problems of the greatest magnitude. For instance, it is becoming imperative to know whether the intelligence of race is in general degenerating; and to obtain a provisional answer to this question, our first tentative investigations will assume there is such a thing as "general" intelligence. It is becoming imperative to know whether ability is generally transmitted; again, our investigations will assume that there is such a thing as "general" ability. Like all pioneer researches, such work has to begin with unparticularized and somewhat sweeping, and therefore obscure and somewhat dubious, conceptions. To start with the assumption of special abilities and specialized forms of intelligence, and to investigate separately each form and every ability would be a task indefinitely more arduous. The investigations made upon the simpler assumption will themselves test its legitimacy, and show whether the simpler hypothesis has to be replaced by a more complex.

It may, then, be impossible, in the present stage of knowledge, accurately to define General Intelligence, or definitely to show that it exists. But the differences implied by this phrase,—the net differences between man and man in all-round mental efficiency, recognized by

the working hypotheses of everyday life and involved in the initial assumptions of social science,—these are differences which theory and practice alike most urgently demand shall be investigated and measured.

In this investigation the experimental method can alone achieve satisfactory results. Valuable work, it is true, has already been done by non-experimental methods. Investigations have been made into the hereditary transmission of ability from father to son, into the influence of environment upon ability, into the effect of parental alcoholism upon the physique and intelligence of children. The collection of the data has met with cordial co-operation from teachers, parents, social workers, and child-students. The publication of the results has roused much general interest. The permanent value of the results obtained, the validity of the methods used have indeed been severely questioned. Criticism may perhaps have gone too far. But probably the investigators themselves would be the first to admit the supreme difficulty of fixing a common standard for mental measurements. And the majority of competent authorities seem to agree that it is extremely unlikely that data can ever be obtained which shall be exactly comparable, and have an absolute value, except in so far as the returns are based on exact measurements made by the method of experimental psychology.

We need, then, a system of experimental tests. For this purpose we must devise simple mental tasks, readily and rapidly yielding results in quantitative form; and we must discover and measure the functional relationship between them and general intelligence. Further, if these experiments or tasks are to be employed on an extensive scale, they must be both simple and quick; they must be capable of being used by numbers of persons, such as school teachers, who have not been specially selected for the purpose because they possess any unique psychological aptitude, or because they have undergone any prolonged psychological training. If any instruments are required, they must be neither costly nor elaborate.

These are the conditions a useful test of intelligence would have to fulfil. In what follows I propose to describe a search for the most efficient of such tests, and to illustrate some of the uses to which they may be put.

The tests chosen for our investigation involved nothing but cheap and portable apparatus. They were intended for personal investigation of the school children singly, not in class. Each test occupied from three to twenty minutes. They were chosen to represent as far as possible the main aspects and levels of the mental process; and fall into three or four main groups.

Four were simple sensory tests—testing the power of discrimination

by touch, by sight, by ear, and by weight. Several previous investigators had declared that the variations about the average measurements of sensibility in man were really due to differences in intelligence, and might be used to measure it. For instance, Sir Francis Galton, who was the first to indicate the importance of psychometry, found that men of marked ability were unusually acute in discriminating minute differences in weight. It seemed, therefore, advisable to endeavour to see to what extent sensitivity would correspond with intelligence in the children selected.

In America, however, several investigators have recently declared that intelligence tends to go not with excellence in sensory functions, but rather with excellence in motor functions. Two simple tests of speed of movement, therefore, were also introduced. It seemed probable, too, that, if the motor processes were combined with sensory processes into a more complex mental test, a yet closer correspondence with intelligence might then be obtained. Accordingly, two sensori-motor tests were added as well.

Even granting that these relatively simple sensory and motor functions, in combination or alone, proved an index of intelligence, it would yet remain to enquire whether they were a better test of intelligence than the higher processes of memory, habituation, or attention. The six remaining tests accordingly dealt with the simpler manifestations of these.

There were thus twelve tests in all.

The tests were applied to two different groups of children at two different schools. The first group consisted of all the boys between $12\frac{1}{2}$ and $13\frac{1}{2}$ years of age (thirty in number) at a superior Oxford elementary school; the second group consisted of all the boys between the same age-limits (thirteen in number) at an Oxford preparatory school. The choice of two distinct and different groups was deliberate; it was hoped that the data obtained with the one would verify those obtained with the other; and, further, that a comparison between the respective results would also throw side-lights on the diagnosis, and (more especially) upon the inheritance of intelligence.

How are we to test the tests? For this purpose a prior and provisional estimate of general intelligence had to be obtained. The headmaster, teachers, examination lists, and schoolfellows all furnished independent lists of the examinees graded in order of intelligence. The headmaster based his estimate upon his personal intercourse with them in and out of class—carefully revising his order at intervals of several weeks. In asking for these lists, no definition of general intelligence was given. We have seen that the conception of such a capacity is not

originally a psychological conception; it has been taken over from the practical notions of the practical man. Hence, the teacher, it was thought, must know best what he meant by the phrase he so often uses. The psychologist's task is, not to tell the teacher what he ought to mean, but rather to find out in scientific terms what, as a matter of fact, he does mean, and whether such a meaning has any justification in reality.

In obtaining the gradings from the boys' schoolfellows each was asked—"Supposing you had to choose out of these thirty boys some one to be your leader in an expedition into an unknown country, whom would you choose as the most intelligent in doing any work that might have to be done, or in dealing with any emergency that might arise? Failing him, which next?" And so on.

The order given by a perfect test of intelligence should correspond exactly with the order drawn up by the headmaster if his estimates were also perfect. If the function tested had no connection with intelligence, the two gradings should have no closer correspondence than any other couple of haphazard arrangements. If the function tested was completely incompatible with intelligence, then the order given by the test should be exactly the reverse of the order drawn up by the headmaster. It is obvious that these three cases will be unusual. Some correspondence there will doubtless always be; yet whether positive, or negative (*i.e.* inverse), it will probably never be perfect or complete. We need, therefore, some means of measuring the degree of correspondence between a pair of variables (intelligence on the one hand, and the test on the other) so as to discover whether one test corresponds with intelligence more closely than another, and if so by how much.

Such a measure is provided by the so-called coefficient of correlation. This is a fraction representing with quantitative precision the degree of relationship between two variable qualities of a group, and statistically calculated from the individual measurements for the two qualities or attributes of the individual members. It ranges from + 1 (unity measuring perfect correspondence), through 0 (zero indicating absence of correspondence), to − 1 (complete inverse correspondence).

Each test was repeated at least once, if possible by a different observer working in ignorance of the results obtained by the first. For this purpose, Mr. Flügel, of Balliol College, Oxford, very kindly collaborated with me during almost the whole period of the experimental work. The coefficient of correlation between two sets of results thus obtained from the same test measures the self-consistency of that test; and is called its coefficient of reliability.

The following Table (Table I.) gives the reliability coefficient and

the coefficient of correlation with intelligence, for the several tests at the two schools.

TABLE I.

General nature of function.	Function tested.	Reliability coefficient.		Correlation with intelligence.	
		Elem. Sch.	Prep. Sch.	Elem. Sch.	Prep. Sch.
	Intelligence	·88	·91	—	—
Simple or lower functions — Sensory	Touch (Lower senses)	·73	·75	·13	−·06
	Weight (Lower senses)	·86	·51	−·13	−·19
	Sound (Higher senses)	·67	—	·40	·37
	Vision (Higher senses)	·50	·54	·29	·17
Simple or lower functions — Motor	Tapping	·51	—	·47	·43
	Card-dealing	·88	·80	·44	·29
Complex or higher functions — Sensori-motor	Card-sorting	·84	·38	·52	·56
	Alphabet-finding	·60	·48	·61	·80
Complex or higher functions — Acquisition	Memory	·70	·93	·57	·78
	Mirror	·52	—	·67	·54
Complex or higher functions — Attention	Spot pattern	·55	·50	·76	·75
	Irregular dotting	·86	—	·60	·84

It will be seen that the reliability of the estimates, whether empirical or experimental, is high. With but one exception the reliability coefficients are over ·5. In the case of the estimate of intelligence, however, and again in the case of the sensory tests, the appearance in the table of a peculiarly high reliability is, I think, misleading. Those who drew up the intelligence lists were all aware of the order given by the current class lists, and were undoubtedly to some extent (perhaps unconsciously) influenced by this common but irrelevant factor. To that extent the estimates correlated for a reliability coefficient were not independent; and, in consequence, the coefficient is unwarrantably large. Again, we were aware of the peculiar difficulty of isolating for measurement such abstract functions as sensory discrimination, and of the unstable mental attitudes the novel tasks and unfamiliar instruments would induce among the boys. We expected, too, that merely negative results would be obtained. We, therefore, gave special attention in the case of these tests to refining our procedure till it was as reliable as it could be made. These tests consequently appear as the most reliable in the table for exceptional reasons; but under unexceptional conditions they would, there is little doubt, be less and not more reliable than the more complex. For the test of the simplest process is never the simplest test.

The most interesting column of figures in the table is the third. This gives us the correlation of the average results of the repeated tests with the empirical estimate of intelligence in the larger group of boys. Of the twelve tests, six furnish correlations below ·5, and six furnish

correlations above '5. The former six are tests of simple functions—sensible discrimination or elementary movements; the latter six are tests of processes higher or more complex. Throughout the series, we may also add, the higher the function tested the closer on the whole is its relation to intelligence.

Let us consider the several tests in detail. The sense of *Touch* and the sense of *Weight* are senses poor in cognitive qualities, and play but a lowly part in the conscious life of man. It is therefore not unnatural to find that they show little or no relation to intelligence. The contrary results of earlier observers with these tests are, I think, to be attributed to their somewhat briefer experimental procedure. The reliability coefficients of earlier experimenters would, if calculated, be undoubtedly low, and therefore their conclusions may, I think, be with safety rejected. In a task so unfamiliar to school children as an experiment upon the lower senses much will depend upon the child's interest, conscientiousness, and care—upon his intelligence, not as operating through or in connection with the sensory function tested, but as helping him to understand the experimenter's instructions and to comply with them in the performance of a difficult and tedious introspection. It was this spurious correlation with intelligence that earlier investigators unwittingly measured.

The test for power of discriminating two points upon the skin has been applied by different observers to races of different cultural status. On collecting the measurements obtained I find that, of different races measured, Papuans are the most acute, Dayaks a little less acute, Todas less still, and so on through Englishmen of the working and of the educated classes, till we come to graduates and undergraduates of Cambridge whose tactile discrimination is the least acute of all. A congenital imbecile, aged 13½, tested by Mr. Flügel and myself, yielded a measurement showing far more acuity than any of the other we have ever found in men or boys. Women students and school girls curiously enough seem to yield figures much about the level of the Papuan men and boys. These facts, therefore, seem to point conclusively (with the exception, shall we say, of the last mentioned) against any connection between intelligence and the much vaunted aesthesiometric test of touch.

Similar objections might be urged, did space allow, against Galton's test of the power of discriminating weight.

The higher senses, *Sight* and *Hearing*, seem, as in other more recent investigations, to be much more closely related to intelligence than the lower senses, touch and weight. I do not, however, find such high correlations as have been found, for instance, by Dr. Spearman of London. Anthropological investigations upon various civilized and

savage races seem to agree with the present results in showing an acuter judgment of pitch by ear and a better judgment of space measurements by eye among groups of superior cultural status; further, the greater musical training enjoyed by the elementary boys seems to show, as Dr. Spearman also has maintained, that superior auditory acuteness is related more to general culture than to special practice.

The grounds for this relationship between the higher senses and general intelligence are difficult to explain. Dr. Spearman regards it as a manifestation of a fundamental identity between General Intelligence and General Sensory Discrimination. I should prefer to seek a historical and biological explanation. The evolution of intelligence in the animal world has been largely dependent upon the evolution of the power to perceive spatial relations. This has reached its culmination in human vision—the sense which in man guides all his movements and dominates all his concrete thoughts and imaginations. The subsequent evolution of intelligence in man himself has been dependent still more upon the evolution of articulate speech, and this has involved the development, not only of an elaborate larynx under delicate neuro-muscular control, but also of an elaborate organ for receiving and analyzing complex sounds and noises, and a delicate mechanism for perceiving minute differences of pitch and timbre.

General intelligence, it would seem, thus manifests little or no relation to senses which to civilized man are of low cognitive value—the source of but little information as to the properties and arrangements of objects about us; but it shows a marked relation to those senses which aid the perception of relations or the formation of general ideas, and are therefore of high cognitive value.

The simple motor tests, *Tapping* with a pencil or pricker, and *Dealing* cards into a single pile, show a correlation with Intelligence slightly higher than the highest sensory correlation. Card-dealing seems a more reliable and constant test than tapping, but unfortunately its results may be vitiated by previous practice in card games. The boarders at the Preparatory School frequently played cards, and had to deal the cards for themselves. With them practice had in consequence mechanized the process, relieving it of the necessity for attentive consciousness, and had perhaps increased the speed of the operation most in boys who were not always the most intelligent. Consequently in the Preparatory Group the intelligence coefficient for dealing is exceptionally low.

The foregoing experiments—whether sensory or motor—all tested relatively simple functions. The correlations with intelligence are also all below ·5, that is, they manifest less than under a half-and-half

correspondence. Directly these simple sensory or motor processes are complicated by the introduction of some further process, the correlation rises to a far bigger fraction.

Thus, after dealing fifty cards one by one into a single pile, the children were required to deal them out again into five piles, *Sorting* them as they went according to the colour of the backs of the cards.

After tapping in a straight line upon a strip of paper, the children were required to tap dots already lithographed in an irregular zigzag row upon a piece of tape carried past an open slot or window in a desk. This is called *Irregular Dotting*. The method, as well as the apparatus required, was devised by Dr. McDougall, of Oxford, as a means of testing and recording attention and fatigue. The child has to watch each dot and aim each hit; he has, therefore, to concentrate his attention. The speed is increased till the boy can tap no faster; his concentration must be, therefore, at its greatest. This is continued till he breaks down at his task; his continuance will, therefore, depend upon his power of sustaining his effort for as long as possible against increasing exhaustion and fatigue. The child's performance thus depends upon his capacity for voluntarily sustaining his attention at a maximal degree of concentration. The number of dots tapped per minute measures the degree of attention; the dots missed may be used to indicate the lapses of attention due to distraction or fatigue. When the process of simple tapping is complicated in this manner the intelligence coefficient rises from ·47 to ·60, and from ·43 to ·84 in the respective groups.

Alphabet-finding illustrates the value of combining sensory and motor processes into a single complex test in a similar way. In Card-sorting and Irregular Dotting tests the simple movements of dealing or tapping are complicated by the interpolation of the perception of colour or position to guide there the movements of the hand. In the Alphabet test the movements are complicated by the introduction of recognition. Two alphabets of cardboard letters, such as are sold for the game of "Word-taking and Word-making," are arranged in a carefully devised, irregular order in rows. The child has to pick out a single alphabet letter by letter in alphabetical order and arrange them in two rows beneath. His speed is measured in seconds. A cardboard screen conceals the letters until the signal is given for the child to start. In order that the letters shall be arranged the same for all and avoid all lucky or unlucky juxtapositions, I now use a large sheet of paper to lay the letters on. The places of the mixed alphabet are marked in ruled squares upon the sheet; and similar spaces are ruled below and marked in alphabetical order in case the child forgets his alphabet.

This test gave, perhaps, the most satisfactory results of all. It is cheap, simple, easy, and rapid. Its reliability is high, so also its correlation with intelligence. The correlation with intelligence rises at the Elementary School from ·44 to ·52, and at the Preparatory School from ·29 to ·56.

Like the test of irregular dotting, the *Spot Pattern* labours under the disadvantage of requiring a special instrument.

The apparatus used is again Dr. McDougall's. It is called a Portable Tachistoscope. Its purpose is to expose for the briefest possible moment (or occasionally for a measurable period of time) some material to be observed or read by the subject—a picture, a group of letters, figures or words, or even a concrete object or a group of such objects. The aim is usually to discover how much a person can read, observe, or remember from a single instantaneous glance, *i.e.* in an interval so brief that all movements of the eyes, all alterations of attention are eliminated. The instruments hitherto used in laboratories are heavy, cumbrous affairs, devised in Germany, quite unsuitable for work at schools and upon school children.

The new tachistoscope devised by Dr. McDougall consists simply of an accurate photographic shutter mounted on a folding wooden frame; this is small and light, and for comparative work sufficiently exact.

For the Spot Pattern test an irregular pattern or constellation of seven or eight bright spots was exposed in a dark room to the subject's gaze in a series of instantaneous flashes by means of a pricked card placed in the tachistoscope in front of a lamp. The subject had to make maps of the pattern from memory upon squared paper specially ruled. The number of exposures or flashes required before the subject could produce the pattern successfully was taken as the measure of his scope of apprehension as tested by this experiment.

The technique of the experiment proved somewhat difficult. The reliability of the results is low. Their correlation with intelligence is, however, extremely high.

The next test I have called the *Mirror* test.

There is a parlour pastime which consists of drawing a pig by the sole aid of the reflection of the drawing in a looking-glass. The task is as instructive as it is entertaining. If you want to study the process by which you form new habits or adapt yourself to new conditions, I can recommend you no better exercise; and if you want to measure your capacity for forming new habits, your adaptability, I can suggest no other method besides some modification of this simple game. Of course, if you have played the game before, the experiment will scarcely be fair; you are already partially adapted. Your previous practice

will make your first attempts a little less imperfect. However, for work on children the interest the experiment arouses seems to give it a distinct advantage over the more strenuous tests with spots and dots.

To convert the parlour game into a psychological test the following modifications were employed. The pattern to be drawn was a circle 20 cm. across. It was marked out by eight holes in a piece of stout card. As with tapping and dotting it was found better for the child to prick his pattern through the holes in the card with a mounted needle than for him to mark it with a pencil or pen. The subject traces the pattern before an upright mirror, both the pattern and his hand being screened from direct vision and seen by reflection only. The pattern was traced six times. The effect of practice may be measured in several ways, the simplest being to note in seconds the total time required. The results show a fairly high correlation with intelligence. In adapting themselves to the special conditions of mirror work the Preparatory boys are much quicker than the Elementary boys; girls may be quicker still, I find; while among University students, the superiority of women over men is amazing. The women generally attributed their superiority to the superior adaptability of their sex; the men, however, attributed it to a peculiar familiarity with the properties of mirrors, acquired by experience and practice, not to any inborn talent.

The persistence of practice was demonstrated in an unexpected way by a second mirror test made twelve weeks later. The children had begun their first series at an average speed of 103 secs. for the first tracing, and left off at an average speed of 39·6 secs. for the sixth tracing. After the three months interval they resumed with a speed of 34·5 secs. for the first tracing of the new sitting (the seventh of the entire series), actually *faster* than the speed with which they left off. It seems as if they had gone on improving during the time that had elapsed. This furnishes a striking experimental parallel to the dictum quoted by Professor James: rest though we may, our brain goes on learning to swim during the winter and to skate during the summer.

The mirror test measures the power of acquiring new associations between movements. The *Memory* test measures the power to acquire new associations between words.

Monosyllables alone were used. Three sets were employed: concrete nouns, abstract nouns, and nonsense words—such as hawj, jeb, sav, kol, etc. Nonsense syllables are commonly used to test sheer retentiveness, independent of extrinsic aids such as those given by the meaning, interest, or associations attaching to significant words. Memory for concrete nouns is helped largely by their meaning; and

memory for abstract words depends largely upon power to understand abstract ideas. This power, according to Meumann, is an essential symptom of intelligence, and therefore intelligence he claimed can be measured by superiority in memory for abstract words as compared with memory for concrete words or nonsense syllables. In this test the "memory machines" were dispensed with. The words were printed in columns of four to eight upon a cardboard sheet, and were covered by a larger cardboard screen sliding over the first and revealing the words one by one through a small opening, cut in the centre, of such a size as to show only a single word at a time. The children saw, heard, and read each word aloud so as to rule out differences due to the preferred sense or imaginal type of each child. Each column was written down from memory immediately after having been once read; and the children's papers were marked according to a special system devised by Meumann.

The reliability of these tests is peculiarly high, ·70 at the Elementary school, ·93 at the Preparatory. Its correlation with the headmaster's estimate of intelligence is fairly high at the Elementary school, ·57, and distinctly high at the Preparatory school, ·80. Its correlation with the assistant masters' and with the boys' estimates are much lower (about ·45 to ·75).

Its correlation with examination results tends to be much higher, ·67 at the Elementary school, at the Preparatory school ·82 in the examination results for literary subjects, only ·69, however, with examination results for mathematical subjects. Thus we seem to have experimental proof of what on *a priori* ground has so often been surmised, namely, that the present examination system tests memory rather than intelligence, or (to be more accurate) tests mainly that aspect of intelligence which is manifested in memory to the neglect of other manifestations besides memory and with the inclusion of other factors in memory besides intelligence. There is a suggestion, too, that memorization may play, both in teaching and in estimations, a greater *rôle* at the Preparatory schools than at the Elementary schools.

There were no signs that superiority in "abstract" over "concrete" memory is a mark of intelligence. Indeed, the correlation with intelligence was highest in the case of "concrete" memory. The introduction of unusual vocables, whether abstract nouns or nonsense syllables, proves on the whole to be a distracting element.

In the remaining portion of this paper I shall turn from a consideation of the individual tests and their several results to discuss the general conclusions that emerge when the tests and their results are viewed together as a whole. These, I shall show, furnish evidence for three

beliefs; first, that intelligence is inborn rather than acquired; secondly, that intelligence is a general and fundamental capacity rather than a sum or series of specific capacities, different in different people; thirdly, that the most efficient tests of intelligence are to be found in the highest mental levels of all, among the complex processes of reasoning,—levels and processes as yet almost untouched by experimental research. This being so, we shall be able both to define intelligence and to discover it; to show that it exists, to state what it is, as well as find it, and measure it when found.

[*To be continued.*]

EXPERIMENTAL WORK IN CONNECTION WITH THE TEACHING OF ARITHMETIC IN ELEMENTARY SCHOOLS.

By MARSHALL JACKMAN,

Ex-President of the National Union of Teachers, Member of the Consultative Committee of the Board of Education, Head Master of Sidney Road Council School, London.

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Some ten years ago I came to the conclusion that a radical change was required in the arithmetic curriculum of Elementary Schools. Under the freedom which at that time had been conceded to teachers with regard to the curriculum and methods of instruction I decided to experiment in the teaching of arithmetic, making a beginning in the lower classes of my particular school.

I considered that, so far as arithmetic was concerned, we were wasting much valuable time in the school life of children of between 7 and 9 years of age in trying to teach them with great trouble what at the age of 10 or 11 they would grasp easily, with less labour on the part of the teacher and with less expenditure of their own time. I considered that much of the time then spent on arithmetic, especially in the early years of a child's school life, could with advantage be given to reading or some other equally suitable subject. I came to this opinion on the ground that the reasoning or logical faculties of young children are not sufficiently developed for them to understand the principles underlying arithmetical processes as they were then taught in schools working on ordinary English Code lines. I believed that

the development of these faculties should be natural and gradual, and that any undue or excessive forcing only led in the end to stagnation of development. I decided that only such propositions should be considered as the pupils could fully grasp at the time, and the problems set should be of such a nature that the conclusions could be readily realized. By experience I had been convinced that in the teaching of arithmetic if children were pressed beyond their capacity they fell back instinctively on the imitative faculty. The processes were memorized, and ability to recollect and reproduce was mistaken for intelligence. Under such conditions arithmetic lost its chief value—its value as a means for training the logical faculties. On the other hand, I felt sure that the faculties of observation and language might be developed more rapidly and to a much greater extent than is usual in the lower classes in Elementary Schools. With a greater opportunity for observation, with a larger practice in expression, and consequently a fuller and more exact vocabulary, I thought the logical faculties might be developed naturally and their development would follow, not precede, facility of expression. The principles which underlie, what to a young child are complex problems, would be more easily apprehended at a later age. For example, in working out my experiment, I have since found, in actual practice, that long division, of weights and measures, money and abstract quantities may be easily taught to children between the age of 11 and 12 in less than three weeks, whereas at the age of 9 to 10, at which they are generally taught in Elementary Schools, it requires months of uninteresting work, and even then the processes are but dimly understood, although the sums may be correctly worked.

At the time when I decided to make the experiment the Regulations of the Board of Education for the teaching of arithmetic expected, under the Scheme A, the older syllabus of work, that a normal child below the age of 10 should be expected to work sums in the first four rules, including long division of abstract quantities; notation up to 100,000 to be used; they were also expected to work sums in addition and subtraction of money.

Under Scheme B, the later syllabus of work and the one generally in vogue to-day, the simple rules and compound rules (money) were expected to be known, but divisors and multipliers were not to exceed 99 and the highest number to be 99,999. No amount of money either in answers or questions was to exceed £99.

Having decided to make a change, I determined to spend less time on arithmetic in the lower classes of my school, which was the senior department of an Elementary School, believing that with proper preparation and with the expenditure of no more than the usual time

for arithmetic in the upper part of the school, the knowledge of that subject would not be diminished in quantity and might be improved in quality. I therefore decided to withdraw the teaching of all but the simplest arithmetical processes from the curriculum of classes below what is known as the Fourth Standard in our Elementary Schools. I decided to confine my syllabus in these classes to mental work, and directed that no complex processes should be taught. Simple questions were to be answered orally, or on paper, and all problems set were to be simple and easily understood. The numbers used were to be such as the children could readily grasp. The concrete examples taken were those with which the children were familiar in their everyday life, *e.g.* marbles, pens, eggs, trays, desks, knives, forks, children's articles of clothing, animals, etc., and only transactions such as children could readily follow and understand were to be utilized in the setting of problems. The problems were not to be confined to the four simple rules, but were to include problems in fractions and also in practice and proportion. Later in working out the experiment I found it possible and desirable for the character of these problems to be extended, and the curriculum to-day in the lower classes, so far as is practicable, includes all kinds of problems given in the highest class of the school, but naturally the numbers used and the transactions dealt with are such as ought to be within the capacity of the children in the various classes. Thus it will be seen that my experiment in operation developed into a concentric system of teaching arithmetic. The children in the early stages are given a thorough knowledge of number. Numbers are analyzed and their relative positions discussed. Sixteen would be analyzed thus: twice eight, or eight twos, or four fours, or considered as ten and six, or twelve and four, or nine and seven, and so on. The relative position of, say, 37 would be discussed as three less than 40 or one more than 36, seven more than 30, etc. An endeavour is made to secure a thorough mastery of the ordinary tables, not by continually repeating them but by constantly using them. There is no attempt to produce prodigies in mental arithmetic but only to prepare the pupil for the definite written work in the higher classes. While the teaching of ordinary processes on orthodox lines is thus delayed until a later period in the school life than is usually the case, problems involving all the rules are taken. A quite young pupil under the scheme readily takes 86 from 95, but he will take 80 from 95 and then 6 from 15; he can multiply 64 by 5, but he will multiply 60 by 5 then 4 by 5 and add the two multiplicands together. The children are also taught to write and read the expressions of quantity and various denominations, including money and weights and measures.

They are taught to change quantities from one denomination to another, and in the end to acquire an intelligent skill in the application of the ordinary tables. Weights and measures and money tables are as far as possible taught by the practical use of the weights and measures themselves. Thus, before the age of ten, under the scheme the normal child would be so equipped that when later on he undertook the more complex processes of arithmetic he would commence the task with an adequate knowledge of notation and numeration, and of the more common tables, and with the power to change quantities from one denomination to another. So that the only difficulty which would be presented by any problem would be that connected with the simplest form of the actual processes involved.

I will now endeavour to describe as briefly as possible the work of the three lower classes. I may say, in passing, that before I commenced my experiment I induced the head mistress of the infants' department of the school to drop all teaching of rules in her department and to confine the arithmetic lessons to purely mental work and notation. In my scheme of work I specially laid down the following conditions :—

1. That the terms used in the problems should be familiar to the children.
2. That the problems should deal with transactions which will be readily grasped by the children.
3. That no problem should be set which cannot be solved mentally.

In order that the reasoning faculties may be brought into play to the fullest and widest extent, no set method of solution should be insisted on, the application of common sense to the operation is all that should be required, and any solution which is clear and logical should be accepted. During this period the application of natural reasoning is the underlying principle of the scheme, and the main object is the orderly development of the reasoning faculties.

At the end of the third year's course the problems will involve such numbers as will necessitate the use of definite methods and the orthodox rules will then be gradually introduced. When that stage is reached the previous training should enable the child to apply the orthodox rules with the fullest intelligence, but at no stage should any individual method of solution be rejected which is clear and logical. As in the three lower classes, in each succeeding class, beyond the fourth, the syllabus will contain problems of greater difficulty. The syllabus even of the lowest class in which written work is commenced will deal with problems involving addition, multiplication, subtraction, and division of abstract quantities, money, weights and measures, and reduction of

money, weights and measures, also very simple problems in proportion, vulgar and decimal fractions, practice, percentages, interest, mensuration, and, in their simplest form, algebraic and graphic solutions.

In the three lower standards a thorough knowledge of numeration and notation should be acquired, and all tables should be constructed and eventually memorized, so that the child is fully equipped for applying the orthodox rules with facility and accuracy on reaching the fourth class. In all classes great stress must be laid on the reproduction by the children themselves of the methods used, which in the lower classes must be chiefly oral, but in the higher classes should be both oral and written.

In applying the scheme in the three lower classes, an arithmetic lesson is taken at every session, extending from fifteen to twenty minutes. This means a saving of some eighty minutes per week on the time generally allotted for that subject in similar classes taught under ordinary conditions. One of the most important features of the scheme is that part which insists on an explanation of the methods adopted being elicited from the children. After a problem has been set and the answer obtained, all the various methods by which the different children have obtained the answer are stated orally by the children themselves and the best methods discussed. Where an incorrect answer is given which obviously points to the use of a wrong method, that method is elicited from the child. It is always found that the most effective teaching can be done when the teacher realizes the errors into which pupils have fallen. At first little stress is laid on the best methods, rather is variety of method encouraged. It has been found in practice that the children soon adopt the shortest and most practical method of securing the answer to a problem. Another important feature in the experiment is that no two problems of the same type are set in the same lesson. I am aware that to many teachers this may be quite unorthodox, but in my opinion the teaching of problems by means of types offers an inducement to a child to fall back on its memory. Of course, if the usual kind of result is aimed at, viz. a high average of correct sums at every stage of the child's career, the working of problems in sets, and the memorizing of types of problems is the easiest method of securing such results. If, however, the education of the child is the chief object in arithmetic, the aim should be the training and developing of the reasoning faculty, that is, making the child think clearly and systematically about the relation of number to number. Every precaution must be taken to prevent the child from memorizing his methods of working problems. Teaching

a particular kind of problem followed by a series of questions on that type is strictly avoided, because I consider that the child after working the first problem or two ceases to use his reasoning faculties, and falls back on his memory, the work becomes mechanical and the exercise loses all its educational value. In the teaching of arithmetic, more than of any other subject in the curriculum of an Elementary School, the chief aim should be the careful training and development of the reasoning faculties rather than a mere acquaintance with and knowledge of processes. Accuracy, of course, must be aimed at, but the attempt to secure this too early in the child's life will lead to the defeat of the object the teacher has in view. Mechanical accuracy will be gained at the expense of intelligent accuracy.

I may at once deal with some of the chief objections raised to the plan of confining the arithmetic to mental work in the early stages. Some say that the strain on the teacher may be too great. That is obviated by the shortness of the lesson. Another objection is that if a child leaves school before reaching the upper classes he will leave without any knowledge of ordinary arithmetical rules. My reply to that is that he will be better equipped for the calculations that he is likely to want in after-life by the mental training he will have secured, than he would be under the old system of learning a few of the simpler rules in arithmetic, and he will certainly be better equipped to continue his study of the subject if he desired to do so. Another objection is that unless the teacher is very skilful some of the children may not be kept fully employed. Of course, the more skilful the teacher the better the work under any system, but I do not find it requires "a David with a sling" to teach effectively under the scheme I have outlined. Precautions are taken to see that every child is making progress, as neither the answers nor the questions are entirely confined to oral work. In certain lessons the answers to the problems are required to be written down, and at other times the questions themselves are written on the blackboard, not dictated by the teacher. In fact, experience has shown that there is very little danger from this point of view.

At the Fourth Standard, that is, normal children of the age of ten, the teaching of the definite rules is introduced—the first written work as distinguished from merely writing the answers to simple problems. We commence in the first lesson by teaching the principles of multiplication and addition of weights and measures, money, and abstract quantities. Three problems, such as the following, are worked first by multiplication and then by addition :—

1. If I gave 3 lbs. 9 ozs. of sugar to each of 3 boys, what would they get altogether?

2. If I gave 3*s.* 9*d.* to each of 3 boys, how much would they get altogether?
3. If I gave 39 marbles to each of 3 boys, how many would they get altogether?

These three sums are set out side by side thus :—

lbs.	ozs.	*s.*	*d.*	t.	u.
3	9	3	9	3	9
	3		3		3

The first sum worked would be that dealing with lbs. and ozs., then the one with money, and last, the one consisting of abstract numbers. By reference and comparison, the process of changing units, or ones, into tens is more easily realized than if the usual method were adopted of starting with the abstract numbers. In dealing with the ozs. the children must realize the changing of one denomination to another, and also when dealing with the 27 pennies they realize they are changing into shillings; then when dealing with the 27 ones, or units, they fully realize they are changing them into tens. Having worked these three sums by multiplication they would then be set out in the form of addition and worked by addition. In this way in the first lesson the processes for addition and multiplication of weights and measures, money, and abstract numbers were taught, and by experience it was found possible that by the end of a week little difficulty was experienced by normal children in working for themselves simple sums of this character. Subtraction and short division would be taught in a similar manner. Throughout the whole of the work of teaching the processes, care was always taken to show that there was no difference in principle whether weights and measures, money, or ordinary numbers were used. It will be noticed that the usual order of teaching was reversed—the weights and measures were taken before the money, and the money before the ordinary abstract numbers, although practically all were taught together. In the early stages the simple rules were invariably taught in this triplicate form. It must not be thought that the commencing of written work meant the cessation of mental work. Each lesson in written arithmetic is prefaced by at least ten or fifteen minutes of mental exercise preparing the way for subsequent lessons in the written exercises. Even in the written exercises themselves, so long as the processes of solution of problems are clearly and definitely set out, the actual work is, as far as possible, performed mentally. Much care, however, is taken to see that all problems are set out in an orderly manner. Correct answers are not accepted unless the steps by which they are arrived at are clearly shown. During the period when only

mental work is taken, the setting of the solution in a logical manner is frequently practised. At times the solutions are set out on the blackboard at the dictation of the children, at others the children set out the solution on their papers. The use of diagrams in connection with solutions is encouraged. Problems involving long arithmetical calculations are rarely introduced. It has been found that the practice of setting long sums has many drawbacks and few advantages, if any. It gives the pupil a distaste for the subject and does not, as is often erroneously supposed, improve accuracy. In each term the course for the year is, as a rule, covered more than once so far as practice in the different sections of the work is concerned. At first the problems are easy; they are gradually increased in difficulty. By these continual changes the faculties of the pupils are better developed and the evil of memorizing processes is avoided. Instead of learning types of sums and applying the process to similar ones, the pupil more readily understands the principles involved in the solution of the problems, and is able to apply them in a rational manner.

The greatest difficulty for teachers in a scheme of this character is that at present there is no text-book which sets out the problems in the order in which it has been found desirable to take them. To a certain extent we have got over this difficulty by supplying each class with several sets of books containing arithmetical examples. The teacher judiciously selects the sums which the children should take. In the lower classes each master is supplied with several complete sets of arithmetic books, and from these he, to a large extent, selects the examples which he gives to his pupils, altering the numbers involved and the transactions set out to meet the capacity of the children he is teaching. By this means a great variety of examples is obtained, and the idea of the concentric system is maintained throughout the school.

Probably the simplest and most illuminating definition of my scheme, so far as it applied to the lower standards, was that given by one of the boys themselves, a lad of nine, who, on leaving the school and seeking admission to another, when asked by the headmaster what arithmetic he did at his previous school said, "Oh, we did not do any arithmetic there, we only talked about it."

I may say the more indolent boys do not escape notice, as much of the mental work, as I have already stated, consists in putting answers on paper. It is true in the Fourth, and even in the Fifth Standards, slips are made, especially in the early part of the year's work, but in practice it is found that by the end of the educational year the accuracy is even better than under the old system, and I find the boys in the Sixth and Seventh Standards are accurate throughout the year. Not

only is this so, but marginal work is rarely practised by the boys in working the more complex processes.

In addition to securing the teaching of arithmetic on more rational lines, the experiment set free more than 80 minutes a week in the three lower classes of the school.

SHOULD GAMES BE ORGANIZED?

A Discussion at the London Society Meeting on February 9, 1911.

MISS M. E. NUTH.—*The Affirmative.*

WHEN I was asked to speak at this meeting, and was told that the discussion was to be on Organized Games, I found myself asking the question, "What *are* Organized Games?" Do they mean the same thing to every one? If you ask a public school man what *he* means he will probably begin to talk about cricket and football. A teacher of small children will think of singing ring-games. To a helper at a happy evenings association it means something else, and to a gymnastic teacher something different again. So evidently the term "Organized Games" is a convenient one, covering games of many kinds. I have never come across a definition of the term anywhere, so I venture to make one. I rather hope some one will disapprove of my definition, and then perhaps in the discussion we may come to clearer notions as to what an organized game really is. I think "it is one in which the plan of procedure, at least in general outline, is laid down beforehand, and is one that can be played in the same way, or in a similar way, over and over again." Then comes the question, "who makes the plan?" Well, that depends on the kind of game.

Sometimes it has been slowly evolved by generations of players, till now there is a certain way of playing it that must be adhered to. This, I suppose, is the case with cricket and football. Sometimes a group of people combine to plan a game, sometimes one person invents it, and teaches it to others. But a plan of some kind there must be, so that there is always the possibility of repeating the game again and again, either with or without variations, as may have been decided.

The question before us to-night is, as I understand it, "Should such games be played by children?" or should all their play be free and spontaneous. Should they ever play games that have been invented by other people, or should they always invent their own?

I suppose most of us would agree that they should not be limited either to the one form of game or to the other. Children need play of

all kinds. There should be times when they should be free to carry out their own ideas without interference, and there should also be times when they should learn to play with others a game that has already been arranged. Both types of play are valuable, but for *school* purposes I am strongly in favour of organized games, and this for various reasons:—

1. They are more suitable for playing with large numbers.

Two or three children playing together in nursery or street can make up their game as fancy pleases, and can carry it out, but where we get numbers of children coming together by twenties, fifties, or hundreds, some form of organization is necessary, or the game soon degenerates into rowdyism. Unless some one can take the lead, and see that the game is played as it should be, fairly and in order, there will be at the best confusion, and at the worst, roughness and actual harm, both physical and moral.

2. Children enjoy organized, orderly games, and will often ask a grown person to play with them, because they feel the strength and support her presence gives.

They feel the need for law and order, but do not know how to get it for themselves. They make rules for the game, but they cannot always get them carried out, so that the play-time often ends in squabbling and disputing. A strong, friendly, sympathetic adult who will enter into the spirit of the game, and who will make suggestions for its improvement is always welcomed by the children.

Directly a number join together for a common purpose there must be law and order—but the play need be none the less delightful. Children at any rate seem thoroughly to enjoy a well-ordered game, if only the organization is done in the right way.

3. Games of this kind create a wonderfully social feeling amongst the children. They can only be carried out by the co-operation of many. All must give themselves up to the idea they are working out, or everything is spoilt. The feeling of doing your best, not for your own benefit, but for the sake of your "side" is a fine one, and one that gives the children a glimpse of the way in which folk of the grown-up world have learnt to co-operate. In this direction, an organized game is a picture in miniature of one of the great world-forces, which has helped to make progress possible.

Society, all the world over, is bound together in a wonderfully complex way, and children may begin to realize this in their play together, and to prepare themselves to take their place in the larger world outside the school. I mean, by learning to "give and take," to adapt themselves quickly to a new situation, and by learning how to combine with others to carry out an idea too big for one alone.

4. There is another reason why organized play should have its place in any scheme that attempts to supply the needs of the children. Mr. Earl Barnes in his "Studies in Education" said: "After an hour of unorganized play with his comrades, where he has been distracted and tired with all the conflicting impulses of the little group, the child turns with pleasure and relief to 'Here come three dukes a-riding,' and insists on its being played with perfect fidelity to every detail. This gives him balance, rest, and freedom, for self-realization in some special parts of his nature." I think there is a good deal to be said for this argument in favour of organized games. In these days of hurry and rush and excitement, and of nervous illnesses and nerve-breakdowns, any form of work or play which gives the child a feeling of mental rest and peace is good; and I quite agree with Mr. Barnes that an old familiar game will often do this.

All these reasons I have quoted point to the fact that there is a distinct place for organized games in school.

The learning to fit one's self into an organized plan, and to adapt one's self to it, is certainly a necessary part of our education. We have to do it, whether we will or not. We have to catch trains whose times are planned beforehand; some of us work to a time-table all day, and most of us, whether teachers or not, have a certain daily plan of procedure, either made by ourselves or by some one for us.

The plan of the year, with its change of seasons, is one that none of us can escape, and we adapt ourselves to it as best we may—by change of dress, or food or habits—sometimes finding it a little difficult in our "quick-change" climate.

The plan of life itself—with its gradual change from childhood to youth, manhood and old age, is one to which we are obliged to submit. We may order the details ourselves, but the plan is fixed.

If, then, this fitting of one's self into a scheme is so universal a necessity, we should surely give some preparation for it in school. You may say that the *work* of the school provides enough opportunity for this—in its regular hours, and recurring subjects and regulation conduct; but a game, I think, is unique in this, that it allows for much individual variation *within* its plan—which is just what life demands.

It will perhaps be clearer if I take a few examples of organized games for young children, and show how they do this—

I shall mention three chief types. 1. The singing games of the kindergarten, which are really an extension of the free plays of the nursery. 2. The traditional singing-games. 3. Gymnastic games. All these types are found in schools to-day, so that I am justified in including all three under the heading of school games. I shall leave

others to speak of cricket, hockey, football, and the like, with which I have had no experience.

1. The so-called kindergarten game is really a small drama based on some bit of the child's experience, and usually set to words and music. It may deal with the events of his own life or with the life of Nature, but it always gives a chance for interesting, expressive bodily movement. It should be so organized that the children have an opportunity of putting their *own* ideas into it. If the teacher keeps to herself all the fun of arranging and planning, and the children just acquiesce and do as they are told, naturally the "play" element is lost. But where teacher and children really plan and play together, the result is pure happiness and great benefit to both. The kind of game we find the children like best is one where the plan of words is so simple that it can be modified and adapted by each set of children who play it. There is one called "The Children's Morning" that is of this kind. The events of every hour of the morning are dramatized, the children themselves deciding what events shall be chronicled for 7, 8, 9 o'clock and onwards, and they decide how the different events shall be acted—the getting-up, dressing, having breakfast, running to school, and so on. The children in turn make suggestions about all this, and finally the game is played. The bare outline of the game is provided by words and tune, the rest is filled in by the teacher and children collaborating together. When once it is arranged, it may be played many times without monotony, and with great pleasure to the children.

Another game allowing of still more variation is the game of "Little Travellers." Two children go out of the ring and discuss their plans together. The others sing a verse, welcoming them back from their journey, and ask what land they have come from. The travellers sing in answer that they have come from "jumping" or "hopping" or "running" land. They show how they wish the movements done, and all the rest imitate. Then two fresh travellers are chosen and the game begins again, different movements being taken each time. This game might be played every day of the week without tiring the children, because they invent it, as it were, afresh each time, but always within the limits of the given plan.

Another of the same kind is a dancing game. One child stands in the middle and sings that he wants to dance, but would like some one to dance with him. He chooses a friend from the ring, and the two dance round hand in hand, while the rest sing the tune. Next, these two choose two others, and these four more, and so on till all the children are dancing, and at each repetition a fresh movement is decided on by the children in the middle; they have a whispered

consultation for a moment and then dance off, doing the particular step they have chosen.

Another similar game deals with the movements of animals. The galloping of horses, flying birds, hopping frogs, etc., the children in turn taking the lead and suggesting what animals shall be represented, and it is astonishing what original ideas they have sometimes. Crocodiles, giraffes, snakes, etc., have all been attemped by children who have paid visits to the Zoo. In all these plays, the plan is organized, the rhythm and tune do not vary, but the details vary considerably, according to the individual fancy of the children. It is this combination of freedom and law that creates the charm. The games are orderly, and yet the children are inventing and originating all the time. Such games as these never go out of fashion, because there is always an element of surprise in them. They may be old and yet are always new.

2. I come next to the *Traditional Singing Games* that have been handed on from generation to generation. I mean such games as Nuts and May, Round and Round the Village, the Muffin Man, Looby Loo, London Bridge, Mulberry Bush, etc. You may find children playing them in the playground or street, or on open spaces in the park, or in the country, and some schools have even begun to teach them now, so that I want to say just a word or two about them.

Why are they so popular? The words and tunes are fixed and unalterable, and so are the rules by which they are played. There is no invention possible. They must always be played in the traditional way. Words and ideas are almost meaningless now, whatever they may once have been, but the children do not seem to mind. The games are still played with vigour and enthusiasm. I believe it is partly the captivating rhythm that sets the feet a-dancing almost whether one will or no, partly the pleasure of doing anything in a ring with others, and partly that there is plenty of activity and "go" in them, and a dash of romance and adventure. But, whatever the reason, there is no doubt children do like them.

Some of the Guilds of Play make use of them in admirable ways, and especially as a means of dethroning undesirable games which are not good for children to play; but, on the whole, I do not think them very suitable for use in school. There are many which I personally would not teach to children in or out of school hours, because the ideas in them are not suitable. For instance, I would not teach a game about taking people off to prison for stealing, or about deaths and burials, or any other morbid idea on which we do not wish children to dwell. A game should be more than a delightful, exhilarating way of spending half an hour. It should have in it something the child needs

for the growth of his body, or mind, or spirit, and nothing that can harm him in any way should come into it. I do not mean that all the traditional plays contain undesirable ideas. Many of them are quite harmless, but one must use judgment in choosing them. As examples of Folk-lore they may all be interesting, but as games for children they are not all advisable.

3. Lastly I come to *Gymnastic Plays* and *Recreative Exercises.*

Here we have games organized for the especial purpose of developing bodily strength and skill in interesting ways. It is realized now that movements are freer and more graceful when they are unconscious—that is when the mind is set on representing an idea rather than on the movement itself. Movements done in games are also less fatiguing than those done of set purpose. This is especially true of games which are accompanied by music. It is the interest which games arouse that is the motive power of the movements, and where there is keen interest, there is less mental friction—all the energy goes into the movement, and so it gains in life and vigour, and more result is obtained in a given time. The more the children enjoy their physical exercises the better will the results be, and consequently the introduction of games as supplementary to drill proper should be welcomed by all teachers. *Gymnastic Games* are necessarily organized, but they allow of much freedom of movement and of individual skill and judgment. The game of Fox and Geese illustrates this fact very well, so does the game of Two's and Three's, and the game of "Filling the Gap." All these are old, well-known games amongst children, but now these and many other newer ones are actually allowed during the drill lessons. The only difference between the new way of playing and the old is that now the teacher is present to see that the games are played fairly, and that all children get equal chances. The ring is perhaps better kept, and lines are straighter, but no child objects to that. The game itself is just as delightful as it ever was, and just as beneficial. The fact is, that organized games are necessary to children. They have always had them—they will organize for themselves if left alone, only their organization is apt to fall to pieces at critical moments—and they themselves feel their weakness and helplessness at such times, and are glad of a stronger power which shall prevent these catastrophes and shall enable them to carry out their ideas to the end.

Further, it is a fact that children need to be taught how to play, and that they like to be taught. Mrs. Humphrey Ward in her address last week, at the Conference of the British Institute of Social Service, quoted a very significant statement made by the educational authorities of Winnipeg, where they have two kinds of public playgrounds for children.

One kind was under municipal control, and the other under educational control. These latter playgrounds were provided with a play-supervisor, who not only superintended the games, but gave advice and suggestions as to playing them. These playgrounds were always crowded.

Those in the public parks had no supervisor—the children were left to look after themselves—and the report states that these playgrounds were practically deserted. Evidently the children of Winnipeg approve of organized games, and I believe the children of London would be just as keenly in favour of them as their Canadian cousins if the alternative were put before them.

Dr. F. H. HAYWARD.—*The Negative.*

In his latest and greatest work, Bergson—the French philosopher who has been called "the most brilliant thinker for a hundred years"—concludes an eloquent passage, describing the evolution of life in the universe, with the following words:—

"As the smallest grain of dust is part and parcel of the entire solar system, involved with it in the indivisible movement of descent which is materiality itself, in the same way all organic beings, from the smallest to the greatest, from the origin of life to the present moment, in all places, as in all times, do nothing but render visible to our eyes a unique impulsion, contrary in direction to the movement of matter, and also indivisible. All living beings maintain this same formidable impulsion, and yield to it. The animal finds his point of support in the plant, man is mounted on the back of the animal, and the whole of humanity, in space and in time, is an immense army which gallops at our side, before us, and behind us, in a headlong charge, capable of crushing all resistance and of overthrowing numberless obstacles, perhaps even death itself."

You may ask what this passage, taken from the pages of *L'Evolution Créatrice*, has to do with organized games. I reply that it is time for Bergson or some one else to write "*L'Education*" *Créatrice*. If evolution has been creative—creative of a huge human brain in which memories and ideas and ideals surge, combine, and beget; creative of speech, of books, of institutions innumerable by which the past can influence the future without compelling it—if evolution has worked this miracle, it is time that education should take up the dropped mantle and become creative too. It is because the movement in favour of organized games is not likely to accelerate this process that I take the negative side to-night. To put the case bluntly—organized games are not good enough. They are too trivial, too brainless, and

too old-fashioned. If we are contented with the commonplace, if we are contented with marking time, if we are contented to cure pedantry by means of puerility, and, in the absence of solid purpose, to exalt the frivolous into the place of the serious, then, no doubt, organized games will be pronounced useful. *They are undoubtedly useful, so long as we refuse to think out our educational plans in advance.* An army without a commissariat department may find it necessary to eat grass. An education devoid of vision may find it necessary to organize frivolity, and, by putting on a long face, may even imagine that it is doing business.

I am reminded of one of the alleged jokes in Oscar Wilde's play, *The Importance of Being Earnest:*—

"*Lady Bracknell:* Do you smoke? *Jack:* Well, yes, I must admit I smoke. *Lady B.:* I am glad to hear it. A man should always have an occupation of some kind. There are far too many idle men in London as it is."

The same thing characterizes the institution which we have to consider to-night—organized games. Lady Bracknell approved of smoking because a man must have an occupation of some kind—a perfectly sound principle in itself. A man must have an occupation, certainly. One of the chief tasks of education must, therefore, surely be to devise with vast forethought a series of noble occupations around which may gather, and amid which may be learnt, a stately philosophy of life. But no; an educationist invents nothing except time-tables, which are analytic contrivances for keeping facts apart, and thus for preventing knowledge from becoming dynamic and passing into action. Having, however, split asunder the realms of knowledge and action by this luckless contrivance, and having even split the realm of knowledge into bits known as subjects, the educationist discovers that there is somehow a lack of driving power in the system. Children are not as keen over sedentary geography as he would like. But he chances to visit a country where he finds a group of people busily engaged in digging a hole in the earth, burying a pillow-case in the hole, immediately digging the pillow-case up again, hanging it on a tree, trying how many of them can jump up to it so as to touch it with their heads, then burying it again in the hole, and repeating the process many times—having, I say, watched this, and found that it awakens unbounded enthusiasm among a people possessing no intellectual interests or social enthusiasm, the educationist thinks he has discovered a great educational secret, and he becomes forthwith an advocate of organized games, merely making a few substitutions, such as that of a football for a pillow-case.

Do not misunderstand. If I had to organize a school to-morrow I should include organized games, but I should include them merely because I haven't imagination enough and originality enough to devise *sensible and significant occupations*. An artist who loses his fingers may try to paint with his toes; or, to take better examples, useless parasites, like Jack in Oscar Wilde's play, may spend their time in practising the muscles of their ears so as to make them move, or in sucking smoke through a pipe and in driving it out through the nose; a man, as Lady Bracknell remarked, should "always have an occupation of some kind." But if the occupation is essentially trivial and meaningless, its only virtue is negative; a man might be doing worse things. Now, my contention is that games are trivial, and can only be approved *faute de mieux*, and that education is following a false scent in laying any great stress on them, is fouling its own nest, and is anticipating and emphasizing its own barrenness of invention. I believe that any system of education which sees any great significance in the process of hitting a ball with a stick or kicking it with the foot is a system of organized obscurantism, and that most of the people who support it are people who may be doing good work in the present, but will exert no formative influence on human progress.

I confess that I should have hesitated to express this view with any confidence had I not, quite recently, discovered that an educational psychologist whose opinion carries weight had arrived at the same. For several years—in fact, ever since I read Professor Adams's *Herbartian Psychology*—I have distrusted the notion of formal training—the notion that power or skill or habit acquired in one department of activity, such as games, automatically transfers itself, with little or no loss, to other departments. This notion, though still all-powerful in secondary schools and largely influential in primary schools, is collapsing on every side. I held—and indeed, I am still inclined to hold—that games might be made morally valuable in a small way (no one doubts that they are physically valuable) if only we used them as a basis for explicit instruction, deliberately discussed such notions as co-operation, obedience, instruction, fairness, etc., and, in fact, used games avowedly as symbols of life. I still hold that something of this kind is possible. But I was surprised and not altogether displeased when I heard Dr. Spearman a few months ago strike at the heart of the games delusion, and avow that the usual games are merely forms of wasteful and inefficient labour, and that, being merely degenerate descendants of the old barbaric occupations with missile and bludgeon, they have ceased to have vital significance, and should be replaced by up-to-date occupations which have a bearing on modern civilization. The trouble

is that to replace them, educationists would have to strain dangerously their powers of creative imagination.

The scout movement supplies damning evidence of the bankruptcy of educational thinking. Scouting is one of those occupations which, I gather, Dr. Spearman would substitute for games. It is brainy, meaningful, healthy, modern; it is so interesting that it will draw boys away from the puerile tricks of cricket and football, and yet it involves a code of morals extending far beyond the one or two commandments of the "sportsman" ("play the game," etc.), and far more categorical and explicit. Scouting sets at defiance most of the traditions which pass current among schoolmasters.

Let us, however, examine the arguments commonly adduced in favour of organized games, and see what these arguments are worth.

First, games are open-air employments, and are therefore health-giving. But this argument is merely an impeachment of our indoor system. If we had open-air schools, or if, at any rate, a very large amount of our school work were done in the open air, this special advantage at present belonging to games would vanish.

Secondly, games provide exercise for the muscles, and are therefore an excellent form of athletics. But here again the question arises whether our other school subjects could not afford this exercise if we chose to grapple seriously with the problem of supplying it.

Thirdly, games are enjoyable, they add to the child's happiness. Here, again, we are in the realm of mental confusion; the implication is that lessons are necessarily less enjoyable than games. If they are less enjoyable, the fault is with our plans and methods. There is no reason whatever why, given sufficient variety, competition, co-operation, sufficient appeal to curiosity, research, construction, etc., lessons should not be as fascinating as games. "As fascinating?" I am inclined to say that they would be *far more* fascinating if only we could convince our pupils that they were meaningful, that they bore on life. Here, again, the scout movement seems instructive.

I must spend a little more time in discussing this plea that games make children happy. The truth is that England badly needs a little psychological ethics. The word "happiness" is ambiguous. It is often confused, and by some of the utilitarians it was identified, with "pleasure"; while, on the other hand, less doctrinaire moralists, as far removed in time as Aristotle, More and Dewey, have insisted on distinguishing the two terms. Dewey's words may be quoted: "There are two types of pleasure. One is the accompaniment of activity. It is found wherever there is self-expression. This is the type of pleasure found in legitimate interest. Its stimulus is found in the needs of the

organism. The other sort of pleasure arises from contact. It marks receptivity. Its stimuli are external."—*Educational Essays*, p. 87. I have elsewhere employed the terms "passions" and "appetites" as indicating the deeper and more wholesome, and the worthless and frivolous, impulses whose gratification results respectively in "happiness" and in "pleasure." A long and confused controversy has raged between the Puritans and their opponents on the same theme. The Puritans felt that life was so serious that there was no time to waste on puerilities. Their opponents felt that some of the things frowned on by the Puritans were fine and fundamental, and that to cut them out of men's lives would be to make men's lives poorer. Both parties were right, both were wrong. The Puritans failed to see that the drama, for example, might be a deep and serious thing. The opponents of the Puritans could not see that frivolous art was no art at all, and that drinking, smoking, card-playing, and gambling were not worth a brainy and healthy man's attention for a moment. The practical result of Puritanism is to make life dull. The practical result of anti-Puritanism is to make life frivolous. Work on the one side thus sharply confronts pleasure on the other. But neither party sees that midway between these concepts lies the concept of interest, of work that is serious and pleasurable at the same time. The confusion is increased by our economic chaos. "Vote for Jones and more work" was a placard which I saw a few weeks ago in a London constituency. What was the sense of the word "work" in this case? Did it mean work that interests and engrosses and ennobles? Or did it mean any drudgery that would carry a wage? Again, there is absolute confusion as to salaries and labour hours of officials, ministers of religion, etc. Any man who is doing work that he loves will do it on a low salary rather than not at all, provided that the salary is sufficient, and that its acceptance does not imply incompetence.

I admit freely that in any system, educational or economic, there *may* remain, after the most sagacious readjustment, a *residuum* of drudgery and a *residuum* of frivolity. There may be humdrum or disagreeable tasks that some one or other will have to perform against the grain; and there may be occasions when a serious man may, on medical or other grounds, relax and play the fool. But until we realize that all the best work of the world is both serious and engrossingly pleasurable, we can never settle the controversy between the Puritans and their opponents, nor, I may add, between the educational advocates and the opponents of school games.

Returning to the latter question after my digression, I would repeat that any educational system which has all nature, all art, all literature to

draw from and is unable to devise splendidly interesting avocations of a truly significant and instructive kind, and has therefore to oscillate between dull pedantry in the class-room and silly puerility in the field, is a brainless system. The third argument in favour of games, namely, that they confer pleasure, is therefore as worthless as the preceding two.

But there is a fourth argument, and here the heavy artillery is brought up. Games, we are told, teach all kinds of moral duties; teach *esprit-de-corps* or co-operation, self-suppression, fairness, perseverance against discouragement, etc. Those who advocate games on this ground sometimes rise to the level of poetry.

> "God give us bases to guard and beleaguer,
> Games to play out, whether earnest or fun,
> Fights for the fearless and goals for the eager,
> Twenty and thirty and forty years on."

And so we might go through "Forty Years On," "Vitai Lampada," and a score of other poems of equal or inferior merit to these. Educational enthusiasm? You can only find it in public school circles when games are mentioned. Even the classics pale their ineffectual fires by contrast. And some foreign nations, we are reminded, are borrowing the games tradition from us, so there must be something in it.

Indeed there is—*provided we cannot devise noble substitutes.* Foreign nations which have had even more bookish, sedentary, and non-co-operative methods of education than we, naturally, in sheer reaction, imitate the only non-bookish, motor, and co-operative institution they can find. The imitation proves nothing, except that games, *faute de mieux*, may serve a useful purpose. They are not the last word.

Let me admit at once that a game—*like any other occupation in which a number of people co-operate*—may act as a kind of concrete basis for a few elementary ideas of conduct. These ideas, however, will not *necessarily* transfer themselves to another environment. Fairness and courage on the playing-field may be a very different thing from fairness and courage in social and political affairs. I have repeatedly asked teachers whether they think "fairness" acquired in games makes people "fair" towards religious opponents; whether it reaches "tolerance." The usual answer is, "That is very doubtful." Courage, too, under the limelight of athletics, is sustained by an intense public opinion; while the nobler kinds of courage draw no sustenance from such a source. In short, it is very doubtful whether "transfer" of ability or faculty takes place as a result of mere training on the playing-fields. If any transfer takes place at all, it is probably as a result of what we may fairly call "instruction"—that is to say, the elucidation of the

higher meanings of such words as "fairness," etc. But this elucidation is precisely what the advocate of games usually discounts; he believes that the training transfers spontaneously and without discussion. "The less said the better," is Mr. Lewis Paton's own expression, and though I doubt very much whether Mr. Paton actually carries out any such policy of silence and reserve as he here formulates—in fact, I am sure he does not, judging from accounts of the great influence he exerts over his boys—the policy he outlines remains a psychological blunder.

I have set forth this argument at some length in "Day and Evening Schools" (pp. 220–5), and at still greater length in "Education and the Heredity Spectre" (pp. 70–75), and I can here only summarize the two arguments adduced.

First, there is the general and accumulating scientific evidence against "formal training," against the transfer of faculty from one department of activity to another. Accuracy does not transfer; neatness does not transfer; observation does not transfer; the experiments of Thorndyke and Woodworth on accuracy, Squire on neatness, and the Göttingen experiments on observation seem here conclusive of the inefficiency of mere "training," apart from discussion, elucidation, exhortation, etc. Accuracy in one department does *not* involve accuracy in another; and so on with the other questions. Now, inasmuch as accuracy and neatness were two of the three crucial instances adduced confidently by Mr. Paton, the health of the formal training doctrine is very unpromising indeed. Only where *identical elements* are present in two pursuits, or only when such means as exhortation and elucidation are employed, does there appear to be transfer.

Second, there is *à posteriori* evidence against the transfer of moral qualities from the playing-fields to the world of life. There is Sir Arthur Hort's confession, at the Moral Education Congress, that, as a result of his experience as master at Harrow, he was disappointed that the "sense of corporate life once gained in a miniature society does not more often develop into patriotism and similar virtues." There is Mr. G. K. Chesterton's statement* that, though physical courage is regarded as all-important at the great public schools, moral courage is rare or non-existent. There is the testimony of *The Times* (Educational Supplement, February 7, 1911) that, though "to act in a certain way is not to be 'straight,' not 'cricket,' not 'to play the game,'" and though "such appeals have undeniable force . . . they do not go far enough; they fail in other surroundings and against other temptations. They answer up to a certain point at school, and in some cases, though with waning force, in a college or regiment. . . . These principles are too

* In "What's Wrong With the World."

far removed from the deeper springs of conduct, and have too narrow a range to be sufficient. They break down too often in the freer life of the university . . . they are not only too weak, but too rude and barbarous a defence to serve. . . . The morality of games has its good points; it insists on cleanliness, physical energy, manliness, straightforwardness (with serious limitations), public spirit. But its aspirations are limited. It has a sovereign contempt for intellectual distinction, and, honest elsewhere, it condones dishonesty in work." And so on. The morality of sport does *not* effectively transfer itself to the rest of life.

Thus breaks down the fourth and last argument in favour of giving a large and dominating place to school games.

Nothing I have said must, however, be interpreted as denying that games possess one or two trifling advantages, though the advantages exist merely because the rest of our school work is badly thought out. A cricket or football team is a social organism, and a boy who plays in it learns what an organism means, and how it demands certain things of its members, and so on. *This first-hand knowledge might be made a useful basis for instruction in civics, in the principles of another organism, the State. It might be made so;* but even here there is a grave disadvantage; a game is essentially a trivial thing, and I doubt whether the best way to cultivate real, serious devotion to the State is by cultivating a puerile, purposeless ambition to win runs or goals. The thing is not good enough; it may help, but *it is not good enough.* Again, the teacher may find that a boy who is a dullard at lessons may achieve distinction in the field, and this, by giving the boy self-respect, provides the teacher with a lever by which he can inspire to better efforts. On the other hand, some teachers complain that the "self-respect" thus saved is not worth much. Again, for very little children games are invaluable; none of the above remarks should, therefore, be applied to the methods adopted in our infant schools.

What practical policy, then, must the educationist pursue?

The true line of development has been indicated in several recent movements.

There is the School City System which flourishes in many American cities, though it probably suffers enormously from the absence of male teachers in the schools. There is the Springfield experiment of Professor Burr, which links stories, myths, etc., with tramps in the woods, care of animals, etc., and which exalts games themselves by associating them with stories of great leaders, patriots, etc. There is, thirdly, the possibility of the formation of a useful ritual, dramatic and symbolic. There is the Open-Air school, with its free and active methods. Above

all, there is the Scout movement *as the type and symbol of other movements which may be devised by educationists as soon as they take off their blinkers.*

Now, in the scout movement we have something very different from games. The scout occupations are not antiquated, artificial, and symbolic, but entirely meaningful, to the scout himself, at any rate. He thinks he is serving his country, whereas no boy who is playing cricket or football ever deludes himself into such a belief, despite the strong opinions held on the subject by the schoolmasters who have established "compulsory cricket." Again, the scouts have a definite and illuminating code of morals, which extends far beyond the narrow morality of games. In short, the initiation of the scout movement was a stroke of educational genius; the patronage of games means, too often, helpless unoriginality.

I conclude, then, that games play a humble though useful part in our present pedantic system of sedentary and class-room education, but that the education of the future will give to them hardly that small amount of attention which we call contempt.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Practical Teachers and Psychology.—"Experienced teachers often attain a very remarkable amount of pertinent psychological knowledge and insight, and are, indeed, among our best practical psychologists. . . . True, they do not call it psychology, but it is psychology all the same, for it is an understanding of mental life. . . . Teachers and parents in so far as they lack this are nothing better than external forces which define more or less narrowly the course of the child's life; they are not, and never can be, agents influencing that course of life from within so as to make it richer and fuller. Such practical psychology can be gained only through that real sympathy with the young which involves not only kindly feeling but power to understand, which is an insight into the child's desires, his plans, his thoughts—an insight which grows by successful practice till at times it becomes almost uncanny. Some people have such insight by natural gift, others have not; the majority have a little of it, which can either be nourished or smothered. The first are heaven-born teachers; and they are few. The second are people—also few, but by no means unknown—who never can become educators, nor ever learn to teach well. These ought never to enter, or if they have unwittingly entered should leave as quickly as possible, the profession of schoolmaster. . . . The heaven-born teacher becomes a psychologist because he cannot help it; the average teacher can only develop into the good teacher by becoming a

psychologist."—*Professor James Welton*, in his book, just published, on "The Psychology of Education."

Committing to Memory.—"Experiments [on university students] occupying some six months show that, whether five lines or 240 lines of poetry are memorized, learning by wholes is, without any exception, more economical than learning by parts, and that the relative saving is much greater in the case of long selections that require more than a single sitting. Corroborative results were obtained from tests upon school children. . . . As a general conclusion, we are doubtless warranted in saying that, in committing to memory any ordinary selection that one is ever likely to have to learn, the most economical procedure will be to read the selection through from the beginning to end till it is learned. If the selection is too long to be learned at one sitting of about 45 minutes [for adults], it will be most economical to read clear through each time, and to devote 30 to 40 minutes at a sitting, the exact amount of time depending upon the condition of the learner. In the learning of longer selections [than 240 lines of Longfellow's translation of Dante's "Divine Comedy"] the most economical procedure might be to divide the matter up into large units that in themselves make thought wholes, to commit these to memory separately, and then to commit to memory some device to hold together the separate parts."—*Dr. W. H. Pyle* and *Mr. J. C. Snyder*, "The Most Economical Unit for Committing to Memory," in *The Journal of Educational Psychology* (U.S.A.) for March, 1911.

Intelligence and Instinct.—"There is no intelligence in which some traces of instinct are not to be discovered, more especially no instinct that is not surrounded with a fringe of intelligence. It is this fringe of intelligence that has been the cause of so many misunderstandings. From the fact that instinct is always more or less intelligent, it has been concluded that instinct and intelligence are things of the same kind, that there is only a difference of complexity or perfection between them, and, above all, that one of the two is expressible in terms of the other. In reality they accompany each other only because they are complementary, and complementary only because they are different, what is instinctive in instinct being opposite to what is intelligent in intelligence. . . . We see that the intellect, so skilful in dealing with the inert, is awkward the moment it touches the living. Whether it wants to treat the life of the body or the life of the mind, it proceeds with the rigour, the stiffness, and the brutality of an instrument not designed for such use. . . . The intellect is characterized by a natural inability to comprehend life. Instinct, on the contrary, is moulded on the very form of life. While intelligence treats everything mechanically,

instinct proceeds, so to speak, organically. If the consciousness that slumbers in it should awake, if it were wound up into knowledge instead of being wound off into action, if we could ask and it could reply, it would give up to us the most intimate secrets of life. For it only carries on further the work by which life organizes matter—so that we cannot say, as has often been shown, where organization ends and where instinct begins. . . . The most essential of the primary instincts are really, therefore, vital processes. The potential consciousness that accompanies them is generally actualized only at the outset of the act, and leaves the rest of the process to go on by itself."—From *Bergson's* "Creative Evolution."

Intelligence and Invention.—"As regards human intelligence, it has not been sufficiently noted that mechanical invention has been from the first its essential feature, that even to-day our social life gravitates around the manufacture and use of artificial instruments, that the inventions that strew the road of progress have also traced its direction. . . . In thousands of years, when, seen from the distance, only the broad lines of the present age will still be visible, our wars and our revolutions will count for little, even supposing they are remembered at all; but the steam engine and the procession of inventions of every kind that accompanied it, will perhaps be spoken of as we speak of the bronze, or of the chipped stone of pre-historic times: it will serve to define an age. If we could rid ourselves of all pride, if, to define our species we kept strictly to what the historic and pre-historic periods show us to be the constant characteristics of man and of intelligence, we should say, perhaps, not *Homo sapiens*, but *Homo faber*. In short, intelligence considered in what seems to be its original feature, is the faculty of manufacturing artificial objects, especially tools to make tools, and of indefinitely varying the manufacture."—From *Bergson's* "Creative Evolution."

NOTES.

Our Annual Conference will be held in the Technical College, Halifax, on July 13, 14, 15. The subject for discussion is: *Youth—Thirteenth to Eighteenth Years—Educational, Social, Hygienic*. Our President, Sir James Crichton-Browne, M.D., LL.D., F.R.S., will preside. The programme is:—

Thursday, July 13.—7.30 p.m., Reception by the Mayor (Alderman F. Whitley Thompson, Esq.) and Mayoress in the Town Hall. 8.15, Presidential Address by Sir James Crichton-Browne—open to the public.

Friday, July 14.—9.30 a.m., Council Meeting. 10.30 a.m., *Youth—Hygienic Aspect*. Papers by Dr. Mary Scharlieb (London) and Dr. Clouston (Edinburgh); followed by a discussion. During the afternoon: Visit to Bermerside Open-air School. Visitors will be received by Councillor Howard Clay (Chairman of

Education Committee) and Mrs. Howard Clay. 7.30 p.m., *Youth—Social and Educational Aspects.* Papers by Mrs. Ogilvie Gordon, D.Sc., Ph.D. (Aberdeen), and F. H. Hayward, Esq., Ph.D., M.A., B.Sc. ; followed by a discussion.

Saturday, July 15.—10.30 a.m., *Youth—Educational Aspect.* Paper by J. G. Legge, Esq., B.A., Director of Education (Liverpool) ; followed by a discussion.

International Congress on Pardology at Brussels.—We are asked, and are glad, to publish the following notice :—"Le 1er Congrès International de Pédologie qui sera tenu à Bruxelles du 12 au 18 août 1911, aura pour objet de coordonner les travaux et les recherches réalisés dans les différents domaines concernant l'étude scientifique de l'enfant, en vue d'établir les bases positives d'une culture intégrale et rationelle. Les communications et demandes de renseignements doivent être addressées au Secrétariat général du Congrés, 35, Avenue Paul de Jaer, à Bruxelles."

First Universal Races Congress.—This is to be held in London, July 26–29, this year. The Executive Committee has drawn up an outline lesson on Inter-racial Friendliness, which they "humbly and yet most earnestly request be given in every primary and secondary school about the time of the Congress." Copies of this, and other information, can be obtained from Mr. G. Spiller, 63, South Hill Park, Hampstead London.

Hon. Assistant Secretary.—We are pleased to say that the sub-committee appointed for the purpose has been able to secure a Hon. Assistant Secretary for the Child-Study Society. Miss K. G. Cash, B.A., has been good enough to consent to fill the post. Miss Cash had much to do with the formation and conduct of the Exeter Society, and our readers will remember her paper in the April number of *Child Study.*

Hon. Sec. to the Journal Committee.—The committee cordially thank those members of the Society who were good enough to offer their services. Miss Enid K. White Wallis has been appointed to the post. As Miss White Wallis has had special training for secretarial work, the committee is specially fortunate in having obtained her services.

Greetings to American Associations.—Miss Kate Stevens, who is giving addresses at San Francisco and Chatauqua during July, has been asked by the Council of the Child-Study Society to convey greetings from it to the American Associations.

Child Study in Canada.—As every one expected, Miss Alice Ravenshill has been seized upon by Canadian educationists, and her services are in great demand. She writes : " I am to speak at the Annual Convention of British Columbia Teachers in Easter week at Victoria ; on April 18 on *Intelligent Observation of Children*, and on April 20 on *Requirements of School Life.* There will be four hundred present at least. On May 8 I speak to the B.C. branch of the National Council of Women on *The Origin of the Family and Significance of Childhood ;* and I am already booked for Vancouver, in November. to speak on *The Physiology of Childhood* to the Association of School Trustees." She is also giving courses of lectures for the Department of Agriculture, Women's Institutes.

Child Study in Spain : An Example to Follow.—Mr. C. R. Chapple, M.A., Lecturer on Education, University College of Wales, Aberystwyth, sends us this very interesting and suggestive note : "In Barcelona, in June, 1910, was inaugurated a laboratory of Pedagogical Psychology as a section of the Museo Pedagógico Experimental, for the gratuitous examination of children. The laboratory consists of five sections which deal respectively : *First*, with the examination of the visual functions ; *second*, with the auditory, gustatory, and olfactory functions,

and with the apparatus of speech; *third*, with the respiratory, circulatory, nutritive, motor, and tactile functions; *fourth*, with the intellectual functions; *fifth*, with the application of pedagogical methods to the case of each pupil according to the data obtained in the previous four sections."

Practical Experiments.—Mr. Marshall Jackman's article in this number is an excellent example of the possibilities and value of real educational experiments by practical teachers. It is also interesting as being the only paper read at the Imperial Education Conference which touched on child study. We are indebted to Mr. Jackman for his courtesy in allowing us to publish it.

Dancing, Singing, and Games.—Teachers who would like to be trained in folk dances, songs, and games, can attend a holiday course under Mr. Cecil Sharp, at Stratford-on-Avon, from July 22 to August 19. All particulars can be had from the General Secretary, Festival Association, Stratford-on-Avon.

Russian.—Is there any one who will review some numbers of a Russian Educational Magazine for us? If so please write to the Editor.

CORRESPONDENCE.—Co-Education.

Sir,—In inviting a discussion on the education of boys and girls together, between the ages of 14 and 21, it seems to be taken for granted that co-education is now accepted as good below that age, but that public opinion still waits to be convinced of its value during the period of adolescence. I would like, therefore, to suggest that if the subject is to be made one of serious discussion, such as may have immediate effect upon the practice of our country, the period of life 14 to 21 should be divided for the purpose of discussion, into two periods—14 to 17 or 19, and 19 to 21. By the established methods of our educational systems, boys and girls are still under intellectual, and largely under physical, control until 17 to 19 years of age; and it is not until after that time, in England, that outward control in educational matters gives place to some sort of self-control in University life, or that of technical school or college: when youth practically takes charge of its own affairs, within the limits chosen by its guardians. If, therefore, you allow this division of time, the discussion might, I think, be focussed a little by the consideration of how the two years 19 to 21 —the first two years of freedom in life—can be best prepared for.

Will it be by a natural, or by a monastic condition of the physical and moral attitude of young men and women towards one another?

It must always be remembered that it is the greatest naturalness, and the least of artificiality, that educationists are aiming at in their endeavour for a rational education. Co-education is not the whole of the subject, only one item—and one that cannot be fairly taken alone, since its value is doubtful intellectually, if associated with competition, instead of with the spirit of helpfulness; with age-comparison instead of with individual development; with imposed values instead of intrinsic values. I believe, sir, if the public could be influenced to consider this question practically, the result would be a more wholesome comradeship through life, of man with man, and women with women, as well as of men and women together.

Isabel White Wallis.

Sir,—I entirely agree with Dr. Kingsford that a discussion on, "Should young people be educated together between the ages of fourteen and twenty-one?" ought

to prove useful. To bring matters to an issue, I assert that they should. Family life, the archetype in this, makes it inevitable and proves both its possibility and desirability. By way of illustration, it seems to me as reasonable to demand separate churches, theatres, houses, and homes for the sexes as to require separate schools, either during school life or life as a whole. Now, this is not to be taken as meaning that the essential differences between the sexes can be ignored and no separate provision made for them in school life. This would be both a stupid and a disastrous view to take. No; but such differentiation can, should, and must be made in co-education schools as will properly meet all fundamental needs, while at the same time preserving that community of life between the sexes which their nature and nurture demand. It is at bottom the old issue in a new form between individualism and collectivism in life. The harmonious admixture of the two is the pathway to progress and perfection.

Can we not have letters giving the personal testimonies of those who have undergone a co-education course, and also a questionnaire on such experience?

A. Coed.

REVIEWS.

Feeble-Mindedness in Children of School Age. By C. Paget Lapage, M.D., M.R.C.P. Pp. 359. 5*s. net.* Manchester University Press, 1911.

The readers for whom this book is primarily intended by the author are school medical officers and teachers or social workers who have to deal with feeble-minded children. The further objects of the book are (1) to emphasize the importance of the subject from the point of view of the community; (2) to point out the hereditary nature of mental defect and the consequences of this fact; and (3) to show that the only way to deal effectively with the problem is by life-long care of the feeble-minded. The author confines himself for the most part to the lesser degrees of mental defect included in the so-called "Feeble-minded" Subdivision of Defectives.

The first chapter is introductory, and is based mainly on the report and recommendations of the Royal Commission on the Feeble-minded, and in some of the evidence given before it which bears specially on the problems discussed in this book. The following seven chapters are devoted to a description of feeble-minded children on both the physical and mental sides, with special reference to speech defects, different types, diagnosis, prognosis and treatment. These are succinctly and judiciously handled.

In regard to diagnosis, useful hints are given as to examining a child for this purpose; but as regards distinguishing a feeble-minded from an imbecile child no criterion is suggested beyond the definition of imbecility which has to do with capacity to earn a living; and as regards the distinction between the feeble-minded and merely backward an illustration is given which presents no great difficulty; but no systematic method is suggested for dealing with this difficult question.

The remarks on prognosis are both sound and seasonable. The biological and pathological aspects of the matter are next briefly dealt with. A very useful appendix on the Training and Management of the Feeble-minded Children from the pen of Miss Dendy follows. There are also a list of homes, institutions, etc., and a glossary and bibliography. Altogether it is an excellent book for the purpose for which it was written.

Educational Problems. By G. STANLEY HALL, Ph.D., LL.D. D. Appleton & Co., London and New York. 2 vols. I. pp. xiii, 710; II. pp. 712. 31*s.* 6*d. net.*

It is as impossible as unnecessary to review these large and handsome volumes. Practically all educationalists know and admire Dr. Stanley Hall, and will be grateful for more from his pen. The books contain the substance of lectures, public addresses, and magazine articles produced during the last twenty-five years, and "newly written and re-cast within the last ten months." The topics dealt with are: the pedagogy of the kindergarten, music, sex, modern languages, history, elementary mathematics, reading and drawing, the educational value of dancing and pantomime; the religious training of children and the Sunday school; moral education; children's lies; industrial education; the budding girl; missionary pedagogy; special child-welfare agencies outside the school; preventive and constructive movements; Sunday observance; the German teacher teaches; pedagogy and the press; school geography; some defects of our [American] public schools; the American high school; civic education.

All public and education libraries should have copies of these valuable volumes. Teachers who can afford should buy them, and all teachers should read them.

H. H.

The Psychology of Education. By Professor J. WELTON, M.A. Macmillan. Pp. xxi, 507. 7*s.* 6*d. net.*

Professor Welton's writings on education and mental science are so well known and highly appreciated that we need say no more about his new book than that it is a welcome addition to his Logical Bases of Education; is written from the genetic point of view; and has great charm of style. The subject is dealt with under these headings: education and psychology; the study of mental life; bodily endowment; general mental endowment; variations in mental endowment; nature of experience; development of interests; direction of activity; learning by direct experience; learning through communicated experience; critical thought; ideals; character. I know of no book which is likely to prove so attractive and helpful to the practical teacher, who, in Professor James's words, "feels hopeless as a psychologist," and not less to all teachers and students.

H. H.

Cats' Cradles from Many Lands. By KATHLEEN HADDON. Longmans Green & Co. Pp. 95. 2*s.* 6*d. net.*

All who are interested in folk-lore will enjoy this monograph on Cats' Cradles. Examples are collected from all over the world, and graded in order of difficulty. Savages greatly excel civilized people in this form of hand play.

H. H.

The Training of Infants, with especial reference to the Sunday school. K. KINGSMILL MOORE, D.D., Principal of the Church of Ireland Training College. Longmans, 2*s.* Pp. 103.

The aim of this book is to urge upon Sunday-school teachers that, (1) "Infants differ radically from adults. (2) Child study is essential for success in teaching" (p. 4). The need of training for mothers and teachers; the need of constant activity for infants; the development from the non-moral to the moral in the child; the length

of lessons, school furniture, the play-work method for infants, occupations, story-telling, etc., are sensibly and simply discussed. The book is too brief for its purpose, unless it be meant as an appetitive. It is a pity that the author permits himself the usual extravagance about the indispensable need for the teacher to love the pupils. This is quite untrue ; indeed love is sometimes a barrier to the best success as a teacher. Must a doctor love every patient ; and is a devotedly loving mother the best nurse. Kindly sympathy and knowledge are the soundest foundations. To say that " Talk is, and must be, the chief means of educating the children " (p. 75), is to contradict most of what the writer says throughout his little book, and is likely seriously to mislead the ignorant.

H. H.

The Journal of Experimental Pedagogy, and Training College Record. Edited (on behalf of the Training College Association) by PROFESSOR J. A. GREEN. Published twice a year. Longmans, 1*s.* net. Pp. 92.

This is worthy of a warm welcome and high praise. If the editor can maintain the level of merit of this first number, he will do great service to educational advance at home, and obtain recognition and respect for British work in educational psychology and pedagogy abroad. Besides very interesting articles there are full reports of the papers, etc., at the annual meeting of the Training College Association, reviews, etc. The articles are :—*The way to develop Experimental Pedagogy*, Dr. C. Spearman ; *Attention—a footnote*, Professor J. W. Adamson ; *Modern Educational Psychology*, Dr. William Brown ; *Social Class and Mental Proficiency in Elementary School Children*, W. H. Winch ; *The Function of Experiment in Educational Science*, H. Bompas Smith, M.A. ; *M. Binet's Method for the Measurement of Intelligence—some results*, Katharine L. Johnston, B.A. ; *Measurement in Education*, Dr. P. Sandiford ; *The Evidence of Mental Fatigue during School Hours*, Gladys W. Martin, B.Sc. ; *The Psychological Bases of School Geography*, C. Birchenough, M.A. ; *Memory Training—is it General or Specific*, W. G. Sleight. Only a large circulation can sustain such a magazine, and therefore, every teacher should make a special point of taking it. It is as good as it is cheap, and it is extremely cheap.

H. H.

Archives de Psychologie. September, 1910, 4 fr. 25 ; December, 1910, 6 fr. 75 ; February, 1911, 4 fr. Williams and Norgate.

The most important item in the issue for September, 1910, is a very thorough inquiry into the Sense of Smell, by M. J. Larguier, des Buncels, well worthy of attention by those desiring to know more of this much neglected sense. M. Paul Dubois discusses the psychological origin of nervous disorders, and concludes that since our mental condition is a complex product, largely resulting from the various influences acting upon us day by day, the pathological conditions which have been thus formed are able to be reformed by new influences. Appropriately enough this article is followed by another by Dr. F. Rush, on Melancholy and Psychotherapy, with a similarly hopeful conclusion. Dr. Claparède contributes a sympathetic and all-too-brief notice of Prof. James, illustrated by two portraits.

The whole of the issue for December, 1910 (206 pp.), is devoted to an experimental study on Voluntary Choice and its immediate antecedents, by MM. Michotte and Prüm, too long to be here summarized.

The issue for February, 1911, is of more than ordinary interest. M. Cramaussel gives some pneumographic curves taken during the sleep of an infant, showing how the regularity of its breathing improved with age, and how, even during sleep, it was

affected by various slight excitations, such as a musical note, or the voices of its parents. The relation between the drawings of a small girl of five years and those of prehistoric man forms the burden of a second article, and M. A. van Gennep's explanatory notes upon the twenty-four drawings are as interesting as the figures themselves. The small girl showed an admirable tendency to neglect the copy set before her in favour of the real thing, to draw the chair and the window as she saw them, rather than the drawings of these she was given to copy. The results occasionally need a little ingenuity to relate them to their originals, but M. van Gennep makes it quite clear that his little daughter had succeeded in representing to her own satisfaction the things *as they appeared to her*. In the same way the art of prehistoric man began in realism, because this was the form of art easiest to execute. Hence, much of the teaching of drawing in the schools is open to the objection that it inverts the order of nature.

There follows an account of some experiments by M. Marcel Foucault, on Association by Resemblance, as a result of which he concludes that resemblance has no direct associative value, but may act as a powerful secondary force to association by contiguity. But the most important contribution to this number is one by Dr. Claparède, discussing the question of affective memory. With the late Prof. James, he holds the view that emotions and sentiments are not themselves objects of memory, and takes up the cudgels against Ribot and Paulhan who have opposed it. Quite apart from the value of the conclusions at which he arrives, the article is a very readable analysis of some aspects of the memory process.

Those who have followed the contributions of Mlle. Julia Degand will be interested in some "Observations on a Deaf Child" she presents in this number.

T. G. T.

L'Education Familiale, Brussels, is the organ of the National League for Family Education, which has for object the spread of pedagogical knowledge among parents, and particularly mothers. The journal appears ten times a year at a cost of five francs; its 66 pp. contains much interesting matter generally very simply served.

T. G. T.

The Pedagogical Seminary. December, 1910, and March, 1911.

The December number contains two addresses given by Dr. G. Stanley Hall, before the National Child Welfare Conference. In one of these he shows how child study has extended its influence from the school proper to the numerous and varied child welfare institutions that exist outside of it. He enumerates some of the problems connected with the defective, the delinquent, and the dependent child, and shows how problems of eugenics, of child health and disease, of recreation, etc., all demand for their practical solution the scientific knowledge that is contributed by genetic psychology. He reviews shortly the present outlook of some of the specialized movements in connection with child welfare, and invites those concerned in these movements to increase the intelligence and efficacy of their work by some study of the psychology underlying it.

Another article in this number by J. E. W. Wallin, gives an account of a local boys' exhibition in Cleveland, Ohio, which represented the work from boys in the city under nineteen years of age, and which included exhibits under the heading of industry, art, collections, pets, and competitions in music, oratory, gymnastics, etc. Such an exhibition seems specially an admirable outlet for the often misdirected energies of adolescence, giving an interest in productive and creative activities, at a

period characterized often by much aimless drifting, idleness, and mischief. Hence, the article is full of interest. In the March number, there is a historical survey by Louis D. Hartson, of various social associations in Europe, from 1100 to 1700 A.D. The writer adverting to the present doctrine, represented by Dewey & Colin Scott's work, and the Boy Scout movement, that it is the business of education to develop the social sentiments of the child, thinks that in this connection, a study of the voluntary associations of Europe will be helpful in showing the strength of the social sentiment, and the various forms it takes in the social education which has made civilization. He gives, therefore, a short account of the early religious gilds, the merchant and craft gilds, the student societies, which were the parent of the university, and the religious associations which prepared the way for the Reformation. A bibliography is added. Another article by Dr. Tom A. Williams, on Intellectual Precocity, based on a comparison of John Stuart Mill and the son of Dr. Boris Sidis, contends that their extraordinary mental development was due not so much to natural outfit, as to intelligent and well-directed training of ordinary intellectual activities in early life, genius being largely a matter of energy and its direction, and in its first steps at all events necessarily a capacity for taking pains.

S. Y.

L'Educateur Moderne. January to April, 1911. H. Paulin, Paris.

This useful little publication has entered its sixth year. In January Dr. V. Pauchet dealt with the Treatment of Idleness, and M. van Biervliet presented an article on Experimental Psychology, taken from a book he has recently published on the same topic. The selections dealt with the conditions that strengthen memory and the measure of intelligence. Perhaps in the latter too great stress is laid on the activity of the sense organs. In the April issue M. Roger Cousinet discussed the question of children's reading, urging a change from the highly moral and instructive topics so common in French reading books, and giving good reasons for his view. There are some useful comments in the March number by M. Frappier on the "Collective Influence of Children upon each other," though his view is perhaps somewhat pessimistic, and truer of French than of English school conditions. Some few pages in the issue for February give an interesting account of the teaching of deaf-mutes at Rotterdam and Asnières.

T. G. T.

Then and Now in the Infants' School: Some Reminiscences. By Clara E. Grant. The Frœbal Society. Pp. 16 (reprint form *Child Life*). 3½*d.*

A most interesting and suggestive account of personal experiences and ideals.

H. H.

Publications Received.—*Journal of Education; Educational Times; School Hygiene; Parent's Review; Betterment; Christian Commonwealth*, (special child number); *Progress; L'Ecole et La Vie; Child Life; Zeitschrift für Jugendwohlfart; Kindergarten* (Berlin); "*Hygiene and Comfort in Infants' Clothing*," by Ella Renaud; "*Report of the State Children's Association*"; "*Medical Revolution*," by Sydney W. Macilwaine; "*Report of the Massachusetts School for the Feeble-Minded at Walham*"; "*The Outlook for Research*," by Dr. R. C. Maclaurin; "*The Problem of the Crippled School-Child*," by E. D. Telford, F.R.C.S., "*Longmans' Natural History Pictures*"; "*Annual Report of School Medical Officer for Staffordshire; "From Slavery to Freedom*," by S. B. Macy.

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Child-Study.

The Journal of the Child-Study Society.

GROWTH: SOMATIC AND CEREBRAL.

By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., D.Sc., F.R.S.

Presidential Address, Halifax Conference, July 13, 1911.

In accepting the cordial invitation given to it to visit Halifax, which, with Leeds, Bradford, and Huddersfield, completes what I may call the great quadrilateral of the woollen and worsted manufacture of this country, the Child Study Society finds itself in a place where child culture in the sense of education has not been neglected. In 1585—three years before the Spanish Armada, and while Shakespeare still tarried voiceless at Stratford-on-Avon, but had contributed to child-life by becoming the father of twins—the Heath Grammar School was founded here under Royal Charter for instruction in classical languages, and since then the lamp of learning has never been allowed to go out or burn low in Halifax, but has been so fed and primed that the light has been diffused through all classes of the community. Schools of different kinds have increased and multiplied, and with the fame of its carpets, has been bruited abroad that of the beneficent work done by the Waterhouse Charity and the Crossley Orphan Home. It is only of recent years that technical schools have been maintained by the Corporation, but technical instruction must have been carried on sporadically in the homes of the people from a remote period, for Camden, writing at the end of the seventeenth century, said of the people of Halifax that they "are very industrious, so that, though the soil about it be barren and unprofitable, not fit to live on, they have flourished."

In the most recently published work on education—a work that is undoubtedly destined to exercise a powerful influence on theory and practice, "What is and What Might Be," by Mr. Edmond Holmes, the

author of the famous circular, the function of education is declared to be "to foster growth," and that recalls to me that forty years ago, in an essay on "Education and the Nervous System," I defined education as "the guidance of growth." It is gratifying to me to find that the enlarged view of education for which I have so long contended is being accepted, and that it is now recognized that the aim of the teacher should be to assist in the unfolding of all the latent faculties of life. He cannot create, he cannot even graft, but he can nourish and exercise and develop, and unhappily, if his efforts be misdirected, he can stunt and mar and distort.

And this enlarged view of education which must henceforth hold the field lends increased significance and importance to the work undertaken by the Child Study Society, for if education be co-terminous with growth it must include those early years before schooling proper has begun, and it must have its maximum influence at the period when growth is most active, and that period is in early infancy and childhood, the period with the scientific study of which this Society is, I suppose, almost exclusively concerned. As I ventured to say when defining education as the guidance of growth, education is throughout life a gradually diminishing quantity, and the first moment of existence is perhaps the most instructive of any.

All recent observations on growth, and especially those of Professor Minot, of the Harvard Medical School, go to show that the early period of life is the period of rapid growth, and that the rate of growth diminishes as life goes on. "Growth consists in the multiplication of cells, and when the animal grows it is its actual substance that increases, and so we might expect that given so much substance the rate of growth would be more or less constant. If the rate of growth were constant, it would take an animal at every age just the same length of time to add 10 per cent. to its weight. It would not be a question whether a baby grew an ounce in a given length of time and a boy a pound in the same time, for the pound might not be the same percentage of advance on the weight of the boy that the ounce would be on the weight of the baby. In reality with its advance of an ounce the baby might be growing faster than the boy with the advance of a pound."

That the rate of growth is not constant, but very far from it, has been shown by a careful series of determinations of daily percentage increments of weight calculated for successive ages by Professor Minot in his admirable monograph. He measured the rate of growth from day to day and from week to week in a large number of guinea-pigs kept under identical conditions as to food and housing. When guinea-pigs are born they are far advanced in development, but the

act of birth—the introduction into this wicked world—is in them, as in human beings, a physiological shock to the organism that involves not merely a temporary check to growth but a loss of substance. Winckel, of Berlin, weighed one hundred new-born children, fifty-six boys and forty-four girls, and showed that birth was uniformly followed by loss of weight, amounting on the average to 108 grm. the first day, to considerably less the second day, and so on until the fifth day, when 220 grm. had been lost and when the tide turned and growth was resumed. And so in guinea-pigs, Minot found that immediately after birth there was lessening of the power of growth, but that on the third day the young were fully recovered and could add 5 per cent. to their growth in a single day. But by the time they were seventeen days old these guinea-pigs could add only 4 per cent. to their weight per diem, and when they were twenty-four days old, less than 2 per cent. At twenty days old the increase was just over 1 per cent., and from this point onwards the increase gradually dropped until it reached zero. At the end of a year the guinea-pig has attained its full size and there is no more growth. Put in another way, as a guinea-pig grows older it takes it a longer and longer time to add 10 per cent. to its weight. The early increments of 10 per cent. are added in two or three days, the nineteenth increment requires ten days, and the twenty-first nearly twenty days.

In the case of the chicken, as Minot has shown, which is born in a less matured state than a guinea-pig, there is at first a higher efficiency of growth. In it, as in the guinea-pig, birth is a disturbing factor, and growth after hatching is impeded, but is speedily resumed, when the rate can be measured at 9 per cent. addition to weight in a single day. But in the chicken, as in the guinea-pig, the rate gradually diminishes, at first by a rapid and then by a slower decline. After the chicken is two months old it never adds as much as 3 per cent. per diem to its weight. It drops in the first two months from a capacity to add 9 per cent. to its weight daily down to a capacity to add less than 3 per cent. It loses in two months two-thirds of its power of growth, for from 9 to zero is divisible into two parts, of which the first from 9 down to 3 would be two-thirds, and the second from 3 to zero would be one-third, a very striking difference in growth power.

To test whether more rapid growth depends on the youth of the individual or its small distance from the date of procreation Professor Minot turned to rabbits, which are born in a very immature state, much more so than guinea-pigs, being blind, naked, incapable of locomotion, or of doing anything for themselves except taking the milk which is their nourishment. Well, the rabbit, the fourth day after its birth, having

recovered from the birth shock, adds 17 per cent. to its weight in twenty-four hours, and thereafter loses growth-power with amazing rapidity, so that when twenty-three days old it can add not 17, but only 6 per cent. to its weight daily. At the end of two months from birth the growth-power has fallen to 2 per cent. daily; at the end of two and a half months to 1 per cent., where it remains until the growth period in the rabbit is closed. We have in the rabbit a definite demonstration of the fact that there is a gradual reduction in growth-power as age advances, and we have in Professor Minot's instructive experiments on these animals an interesting illustration of the inimicality of illness to growth, for that at once ceased altogether on the occurrence of a trifling feverish attack. This is a warning to us that in the case of children, if we desire their full growth and development, we must avoid illnesses as much as possible. The rabbits rallied and made up for lost time in growth, but that is not always the case in the human subject, and I have seen in well-grown families individual instances of short stature that were attributed to and dated from attacks of measles or scarlet fever, from which the well-grown members of the family had escaped. There can be no doubt that growth in childhood is peculiarly susceptible to morbid influences, and that, apart from the many specific pathological consequences which follow the zymotic diseases in early life, these may interfere with body growth. The tissue that suffers most frequently from interrupted growth is the skeleton. That is specially vulnerable owing to the fact that the bones are structurally more backward in their development than the softer tissues, but all the tissues are in a state of physiological unrest while rapid growth is going on, and even comparatively weak forces, which would have no effect on the more stable constitution of the adult, may permanently deflect the course of health and growth in them. Normal increase in stature and weight can only proceed in the child in circumstances that make for health; in the absence of these progress may be retarded or arrested altogether, and even brief and apparently slight illnesses may leave an appreciable mark on weight and stature. It is in the slum areas of our big towns, where the zymotic diseases flourish, that instances of stunted stature are most abundant.

As regards the rate of growth in man, we do not possess such an adequate series of statistics as is desirable. We have a considerable number of records of the weight of babies from birth up to one year of age. We have also numerous records of the weights of school children ranging from five up to eighteen or nineteen years of age. There are a few records of youths at universities, and of girls at colleges. But there are big gaps to be filled up, and no more useful task could be performed by members of the Child Study Society than the collection of accurate

information on child growth. It seems extraordinary that in this enlightened age no general system of family or school registers for vital facts should have been adopted. As regards our elementary schools, we shall soon, under their medical inspection, have information of incalculable value, but as regards the family I do not believe that there has been as yet any systematic attempt to preserve its annals. Even the ancient and meagre records of the family Bible have gone out of fashion, and men and women for the most part set out on life with only the scantiest knowledge of their own antecedents and capabilities. What is wanted is a life chart for every man and woman, which shall faithfully set forth their origin, and trace out their voyage, marking their rates of sailings at various times and under varying conditions, the rocks and shoals they have encountered, the favouring currents that have carried them on. The chart should include all the returns of the educational school register, but should go far beyond these, recording height and weight at birth, and at regular intervals thereafter, the date of vaccination, and of weaning, and of the appearance of the several teeth, the names and durations of all diseases that have been experienced, and other facts calculated to throw light on physiological development, and morbid tendencies. The bungling that takes place over the filling up of the simplest returns, the indifference to vital history which leaves tens of thousands of people in ignorance of their own age—the folly which leads so many to repudiate even to their medical men family complaints well known to them, do not encourage the hope that we shall soon see life charts in general use, but there is in some quarters a growing recognition of the truth that a man's present is the outcome of his past, and that he must know his past in order to control his future, and that he cannot expect to understand his moral and mental biography without a valid calendar of his physical organization. If a few cultivated people will make a beginning the custom will spread, and it is surely for the members of this Society to take the lead in a matter so cognate to its mission.

But in the absence of the full and complete details which we desiderate, we have even now sufficient evidence to make it clear that in man as in the lower animals, there is a steady decline in growth as age advances. Even before birth this is so. Of the early development of the human embryo, we have no measurements, but from the third month of the ten lunar months of intra-uterine life we have trustworthy observations, and these establish that from the third to the fourth month the increase in weight is 600 per cent., while from the fourth to the fifth month it is scarcely over 200 per cent. In the sixth month the increase falls to 100 per cent.; in the seventh month it falls still further; while

in the ninth and tenth months it becomes very small indeed, less than 20 per cent. If we contrast the increase of 600 per cent. in one month of pre-natal life—the fourth—with the increase achieved by the baby in one year after birth, which is 200 per cent., we shall realize how enormous is the cell multiplication near the beginning of life.

It is not possible at the present time to give any figures as to the daily or monthly percentages of increment of growth over the whole period of post-natal development in the human species, but yearly percentages over a certain period have been arrived at, and these show, as I have said, that from birth to the age of one year the increase of weight is 200 per cent., but from the end of the first to the end of the second year only 20 per cent., and thereafter it fluctuates in the neighbourhood of 10 per cent. until the age of thirteen, when a distinct rise takes place followed by a decline which goes on slowly until growth power is exhausted at the twenty-fourth year. The enormous drop in the growth increment from 200 per cent. in the first year to 20 per cent. in the second, observed by Professor Donaldson, of the Wistas Institute, Philadelphia, suggests to Professor Minot the remark that the phenomenon may well arouse our attention and convince us that we are approaching a most important scientific question as to why the drop comes in this way.

The figures for the human species quoted have referred to boys, but those relating to girls, with slightly different values, correspond. As in the females of other species, growth in them is less active than in boys, and they do not quite attain 200 per cent. for the first year, but they, too, drop like the boys to about 30 per cent. in the second year, and to 10 per cent. in the third. Professor Axel Key, by statistics drawn from 18,000 Swedish school children, has confirmed the well-known fact that maturity is reached earlier in girls than in boys, and that in respect of growth the ill-nourished girls follow exactly the law of growth of the boys. Growth is a function of nutrition, and puberty is a sign that the somatic growth is so far finished that the organism produces a surplus of nutrition to be used in reproduction. Organically, reproduction is also a function of nutrition, and, as Herbert Spencer pointed out, is to be regarded as discontinuous growth.

The rate of growth is within certain limits influenced, and materially influenced, by external conditions. Temperature is highly influential, as we may all demonstrate for ourselves in the case of the tadpole, the development of which can be retarded at pleasure by lowering the temperature of the medium in which it lives. Seasonal changes, in which, of course, temperature is an important factor, are influential in the human species, and it has been shown that in school children growth

is feeble from the beginning of December till the end of March or beginning of April, and is three times as great from July to December. Growth is retarded by school work and accelerated by the holidays, a fact which, when it becomes generally known, our stumpy children will not fail to emphasize; and race, social condition, and food, have all a certain potency in relation to growth.

In connection with food and the growth-rate, I should like to refer to a highly interesting table prepared by Aberbalden and quoted by Minot, in which is shown on the one hand the number of days needed to double body weight in a number of different species of mammals, and on the other the constituents of the mother's milk of these mammals. Disregarding the other constituents of the milk, and considering only the albuminoid or proteid contained in it, an exact proportion is found in each case between the amount of proteid in the milk and the rate of growth of the animal. Thus at one end of the scale we have man requiring one hundred and eighty days in which to double his weight and living on milk which contains only 1·6 of proteid in 100 parts, and at the other we have the rabbit which doubles its weight in seven days and lives on milk containing 10·4 parts of proteid in 100 of milk. Intermediate between these we have the horse doubling its weight in sixty days and with 2·0 of proteid in 100 parts of its milk, the goat doubling its weight in nineteen days and with 4·3 of proteid in 100 parts in its milk, and the dog doubling its weight in eight days and with 7·3 of proteid in its milk. In every case as is the proteid content of the milk so is the rate of growth, rapid when it is large, slow when it is small. "This looks at first sight," as Professor Minot has said, "as if there were a relation between the composition of the milk and the period of growth of the animal, but you know very well that if you take the milk of the cow containing 3·8 parts of proteid in 100 parts of milk, and feed with it a human baby whose mother's milk supplies only 1·6 parts of proteid in 100 of milk, the baby does not grow at the same rate as the calf, doubling its weight in forty-seven days, but at its own rate, doubling its weight in one hundred and eighty days, or even at a reduced rate, notwithstanding the increased ingestion of proteid. It is obvious, therefore, that it is something more complicated than a mere question of food supply with which we have to deal. We have here, in fact, one of the beautiful illustrations of the teleological mechanism of the body. These various species of mammals have their characteristic rates of growth, and by an exquisite adaptation, the composition of the mother's milk has become such that it supplies the young of the species each with the proper quantities of proteid material which is needed for the rate of growth of which the young

offspring is capable. It is a beautiful adjustment, but there is not a causal relation between the proteid matter in the mother's milk and the rate of growth of the young. It is an example of correlation, not of causation."

I have been speaking of the growth of the body generally, but it can be scarcely necessary to remind you that the rate of growth of the different organs and tissues of which the body is composed is very unequal. Longfellow said: "What the child is to the man, his counterpart in miniature," and in doing so he was incorrect, for the baby is not a miniature of the adult or a model on a reduced scale, but something entirely different in form and proportion. To contrast the figure of an infant eleven months old enlarged so as to be equal to that of a full-grown man, as has been done by Dr. Forsyth in a striking plate, is to realize the profound changes that have taken place during the years of growth. The infant's head is relatively large, but its arms and legs are short. The mid-point of the body obtained by bisecting the height, which is at the pubes in the adult, is in the infant almost half-way up the abdomen. The slope of the shoulders, the form of the chest, the fulness of the abdomen, the development of the leg muscles, and the shape of the feet are all strikingly different at the two ages.

The enlarged infant is, indeed, a hideous monstrosity beside the Apollo Belvedere in his splendid symmetry and fitness. The out-standing impression derived from a cursory glance at the enlarged infant, it has been said, is that its body is too big for its legs and its head too big for its body.

The several organs or viscera which the body contains vary largely in their rates of growth, and taking the animal body as a whole it would seem that it is constructed and conducted on a federal system. There is a central sovereign authority dominating and uniting the whole, but there is in every organ a certain autonomous power enabling it within strict limits to regulate its own domestic affairs, that is to say its growth. While participating in the general life of the whole organism each organ has a life of its own, and the different organs do not even die at exactly the same time.

With two exceptions every organ in the body does grow during the passage from infancy to maturity. The exceptions are the suprarenal capsules and a gland in the chest called the thymus gland, bodies which have evidently an important but still undefined *rôle* to support in relation to nutrition in fœtal life and in early infancy, but which having served their turn are superannuated and wither away. All the other organs are absolutely heavier in adult years than in infancy, but while some of them, the lungs, the stomach, and the spleen, retain

their original proportionate weight to the body as a whole, others, the liver, the heart, the kidneys, and the salivary glands, show a decrease in proportion to the body weight as a whole. And of all the organs that show decrease, that is most marked in the brain. The increase in the weight of the body as a whole, from birth to maturity, is twenty-fold, but the increase in the weight of the brain is only threefold. The brain is relatively three or four times as large in infancy as in the full-grown man, and yet in infancy its functions are practically non-existent. At birth the proportion of the brain weight to body weight is about 1 to 6. At the tenth year it is 1 to 14; at the twentieth 1 to 30; and after that about 1 to 36; while in old age there is a further slight increase in proportion.

Now we are still sadly lacking in knowledge of the growth of that great co-ordinating organ the brain. We have measured its increase in bulk and weight at the various stages of development, but we know nothing of the rates of growth in the different parts of which it is built up. It is certain that the brain has manifold functions and that these functions come into play not all at once but in definite sequence, and we are therefore entitled to conclude that growth or development goes on not simultaneously throughout the organ, but in different parts of it at different rates and to different extents in different individuals.

As you are all doubtless aware an enormous advance has been accomplished in our acquaintance with localization of function in the brain during the last forty years. Thanks to laborious investigations began in this country, in a little Yorkshire laboratory, by Sir David Ferrier, we can now mark out on the surface of the brain certain areas in which visual, auditory, and olfactory impressions are received and dealt with, and in which the movements of the leg, arm, neck, mouth, tongue, and eyes, are represented, but there are large regions of the cortex, the precise functions of which are as yet undetermined. The exploration of these is still being steadily pursued by electrical excitation and by watching the defects produced by removal of circumscribed parts, by observing the disorders of body or mind occurring in local diseases of injury of the brain, by comparison of the human brain with the brains of other types of the animal creation, and by a study of the different characters and arrangement of the nerve cells in different parts of the brain.

These methods of research in brain function lie beyond the sphere of the ordinary members of the Child Study Society and must be left to specialists, of whom a good many are included in our ranks, but I wish to suggest a way in which our ordinary members, who may be described as serious amateurs, may materially assist in the advancement of cerebral

physiology, and that is by making a simple series of craniometrical observations. Attention has, during the last half century, been so concentrated upon the living palpitating brain within, that its rigid outer casing, the skull, has been, if I may so say, ignored, at least by physiologists, for anthropologists, of course, have never ceased to recognize the assistance rendered by head-form in the study of races and consanguineous groups, and in that of prehistoric archæology and the history of peoples.

The brain is a fountain of knowledge when interrogated by observation and experiment, but the skull too has a tale to tell when judiciously questioned, for while all parts of the human skeleton exhibit distinctive traits, the more essential human characteristics are focused in the skull. It was indeed the study of the skull that was the starting-point of our modern cerebral physiology, for it was the craniological observations of Gall and Spurzheim that first suggested localization of function in the brain. It is easy nowadays to make fun of the phrenologists, and to ridicule their bumps and their faculties, but they gave an enormous impulse to the study of the brain, originated mental physiology as apart from mental philosophy, and however crude and extravagant some of their conclusions may have been they collected much valuable material, and made many shrewd guesses. No doubt phrenology ran down into gross charlatanism, but to talk of the leaders of the movement, men like Gall and Spurzheim, and Combe and Noble, as quacks—and that has been done—is an outrage. I wish we had a number of such quacks to-day. They were sincere seekers after truth, and far in advance of their time on such subjects as hygiene, education, penal discipline, and the treatment of the insane. Combe's work on education may be read with profit to-day by any student of child study at this hour.

But the craniology which I suggest to you is something very different from that of the phrenologists. To them the skull was opaque, to you it is transparent, for we can now by the aid of science practically look through it and see the brain centres lying beneath; we can map out on its surface every brain centre that has been localized, and we can do this with such precision that the surgeon is able, with unerring skill, to cut out of the skull a little circular disc exactly over any little tumour or lesion that may require removal. Now the skull is made for the brain and not the brain for the skull. The skull is not, as some seem to think, a hard mould, into which just as much brain matter as it will hold has been poured. It is, notwithstanding its hardness, an elastic envelope nicely adjusting itself to the size and shape of the organ it is made to protect, and fitting it like a glove. And that is the point on which I wish to insist.

The contour of the skull affords a clue to the balance of parts in the brain within, and the changes that take place in that contour correspond with changes in brain growth. The skull, therefore, is in a general way indicative of mental capacity, and if we could read it aright would supply information as to individual mental characteristics and traits. In extreme cases we all recognize this. In microcephaly, we at once associate the small contracted skull, which by premature ossification of its epiphysus has left no room for the expansion of the brain beyond the infantile type, with idiocy, while in the breadth and elevation of the forehead covering the fore-brain of a Cuvier or a Goodsir, we see indubitable evidence of high intellectual gifts. But between these extremes there are types of skulls, which without accepting the generalizations of Lombroso, we associate with a high or low level of intelligence, with mental disease, or with criminal propensities.

Skulls vary as much in form as do human beings in intellect and character. No two skulls were ever exactly alike, but the skull does not afford as good a means of personal identification as do finger-prints. The creases and ridges in the skin, the loops, arches, whorles, and composites are "ineradicable and unchanging" from infancy to extreme old age; but the length and breadth of the skull, although Bertillon included them in his measurements, are subject to marked alterations during infancy, childhood, and youth. And slighter, but still perceptible changes in many cases occur during adult life and in old age, but it is these alterations in the dimensions of the skull at the different epochs of life that, it seems to me, if carefully and systematically recorded, in a number of cases, would throw instructive light on brain growth and mental evolution.

It is, of course, in the earliest years of life—in infancy and childhood, when brain-growth is most active, that the most noticeable changes in the shape of the skull occur. As the head increases in size, and as its cortical nerve-cells develop, its outline is altered, prominences present themselves, or depressions are accentuated, and the head of the child of five or six years old is often very different in outline as well as in dimensions from what it was in the infant of five or six months, so much so that it would be impossible to say in many cases that the one was an enlargement of the other. In early infancy there is a change in the form of the head which is easily observable, and that is an increased fulness and roundness in the hind part, or occipital region, as it is called. This region, which is very flat at birth, swells out as it were, during the first year of life, its upheaval corresponding with the growth of the cerebellum, or little brain. The chief function of the cerebellum is, as I dare say you know, to maintain the equilibrium of the body by

co-ordinating the movements of the muscles of the trunk and limbs, in standing, walking, running, dancing, skating, flying. But equilibrium matters not to the fœtus, and is of little importance to the infant, that entrusts the maintenance of its equilibrium to its guardians, until it begins to sit up and totter about, during the latter half of the first year of life, and so at birth, and for some months thereafter, the cerebellum is not required and remains small and rudimentary, but the moment that its services are called for it rises to the occasion, grows rapidly, elaborates its structures by the multiplication of new cells, and by their migration and transformation, and causes bulging of its osseous covering. And throughout boyhood and girlhood, changes in the configuration of the head go on. It is at about the sixth year of life that the frontal lobes, the anatomical substratum, in part at any rate, of the intellectual functions undergo rapid development with, in many cases, accompanying prominence of the forehead. By conference with experienced and observant hatters, who have kept records of their customer's heads, I have ascertained that the heads of schoolboys from eight to eighteen years of age, while generally adhering during growth to one type or pattern, in certain cases exhibit, with increase in size, remarkable aberrations in shape, and an entire change of contour.

Whether education, rightly or wrongly directed, does anything to modify the form of the head it is impossible to say, but that it prolongs the period of the growth of the brain is evidenced by the statistics, collected in the anthropometric laboratory of the University of Cambridge by Venn and Galton. They grouped the students into three classes :—

(*A*) A first-class man in any tripos examination, or one who is a scholar of his college.

(*B*) All the remaining "honour-men."

(*C*) Candidates for the ordinary degree or "poll-men."

Owing to the system of examination at Cambridge, and the knowledge of the men by their tutors, these three classes can be determined with great accuracy even in the case of undergraduates. What was the difference in the physical characteristics of the A, B, and C classes ?

In respect of height, weight, breathing or squeezing power there was little or no difference between any of the classes.

In respect of eyesight, there was a decided inferiority of the B's, as compared with the B's and C's taken together.

In respect of head measurement, there was a decided superiority of A's over B's and of B's over C's.

"We find," said Sir Francis Galton, "that a 'high honour' man at the age of nineteen possesses a distinctly larger brain than a poll-man (that

is, a student who takes an ordinary degree), in the proportion of 241 to 230·5 or one that is nearly 5 per cent. larger. By the end of his college career the brain of the 'high honour' man has increased from 241 to 249—that is, by 3 per cent. of its size; while the brain of the poll-man has increased from 230 to 244·5 or 6 per cent. Four conclusions follow from this:—

"(1) Although it is pretty well ascertained that in the masses of the population the brain ceases to grow after the age of nineteen, or even earlier, it is by no means so with university students.

"(2) That men who obtain high honours have had considerably larger brains than others at the age of nineteen.

"(3) That they have larger brains than others, but not to the same extent at the age of twenty-five, in fact, their predominance is by that time diminished by half of what it was.

"(4) Consequently high honour men are presumably as a class both more precocious and more gifted than any other. We must, therefore, look on eminent university success as a fortunate combination of these two helpful conditions."

The growth of the brain, and therefore the size of the skull, have, as a rule, reached their maximum at nineteen years of age, but Galton's observations prove that by suitable exercises brain growth and skull expansion may be pushed beyond that point up till twenty-five years of age at any rate; and although conclusive evidence is wanting it is highly probable that in some instances under stimulation they may go on until middle life, or even into old age. The tracings of the head of one distinguished statesman, taken regularly on the purchase of his annual silk hat, have been preserved, and these show that his head went on increasing in size until he was seventy years of age, the increase being certainly not due to any osseous thickening, for his mental powers were undimmed and seemed indeed to gain in vigour as his head increased in size.

After its full size has been attained the skull loses its plasticity and becomes stereotyped—or only very grudgingly adapts itself to the recessional movements of the brain, and so in old age it ceases to be a true index of the size and form of that organ. In senile atrophy there is thickening of membranes or effusion of fluid on the surface of the brain, the amount of which cannot be gauged by any outside measurements. Still, even in senile decay, the skull seems to make an attempt to follow the retiring brain, for the hatters attest that a considerable number of men over forty show head shrinking and require to reduce the size of their hats even when there is no thinning of the hair or scalp.

In insanity the changes in the brain are for the most part too rapid to be in any way reflected in skull form; and in chronic cases the wasted brain is waterlogged and shrunken within the skull, but here again there appears to be occasionally some modification of skull form corresponding with pathological distortion of the brain. In one or two instances casts of the heads of chronic lunatics, taken at long intervals of time, have shown unmistakable changes in shape.

But it is not with pathological, or senile, or adult changes in the brain and skull that the votaries of child study are concerned, but with those that go on in the active growth period when these changes are most conspicuous and significant, when the skull fashions itself to the brain, and is therefore a criterion of its development. There are, no doubt, a number of changes going on in the brain during its development of momentous importance in relation to mental evolution, to which external measurements can furnish no clue. These cannot indicate the myelination of fibres, the branching of cells, the deepening of the cortex, the formation of gyri, the amount of blood-supply, but they can disclose changes in the volume of the brain and in the balance of its several parts—facts of primary importance.

I venture to predict that a few simple craniometrical observations, made at regular intervals during infancy and childhood, will constitute a contribution of value to a living science of anthropology, will often in the case of an individual child clear up difficulties and give insight, and, as applied to large groups of children, provide a test by which to judge our many and diverse educational methods. Suppose, for instance, that a series of measurements extending over a number of years, revealed that in one of our great public schools the percentage of brain growth in boys from twelve to eighteen years of age was considerably lower than in boys of the same age attending a day school and leading a family life; then that public school would have to amend its ways, with the result, probably, of yielding a product less "woefully disappointing" than its present one is declared by Mr. Leyton, of the Manchester Grammar School, to be. Suppose, again, that in one of our preparatory forcing schools, dominated by the iniquitous scholarship system, the rate of growth from eight to twelve years of age was found to be in excess of that of boys of the same age and station reared under home influences, then that preparatory school would have to slacken its pace to the avoidance of many risks to its pupils in the years to come. Suppose, further, that of two elementary schools, one conducted on the mechanical obedience system and the other on the self-realization system of Mr. Holmes, the latter gave the better results in well-balanced brain growth, then Mr. Holmes' contention would be vindicated. I

can conceive a score of different ways in which the craniometrical observations suggested would turn out to be of practical utility, and would help us in the guidance of growth.

And the craniometrical observations necessary to supply all the data requisite for practical purposes are exceedingly simple, and may be conducted by any one without special training. The calipers and delicate instruments for measuring angles, employed by those engaged in the higher anthropology, in the comparison of the prehistoric and recent types of mankind, or the higher and lower races of mankind, or of the skulls of men and those of animals, domestic and feral, are not necessary in taking ordinary head surveys. All that is required is a band of thin lead, covered with leather, which when bound round the head and kneaded against it will nicely adapt itself to all its curves and sinuosities and can then be transferred to the plane surface of a sheet of drawing-paper, where an accurate tracing of the contour of the head can be made. Two tracings of the head are required, one of the circumference of the head on a horizontal plane just above the ears, and the other across the vertex between the external openings of the ears. From these tracings the length and breadth of the head can be measured and the cephalic index calculated, and its height can also be measured, and then, by multiplying together the maximum length and breadth and its height, a figure for comparison can be obtained. The *conformateur*, as used by hatters, affords instructive outlines on a reduced scale; but it is expensive and therefore inaccessible, and the leaden band does all that is needed.

The growth which I have been speaking of is not that which has most generally engaged the attention of members of the Child Study Society. It is psychical and not somatic growth that they have been for the most part watching and gauging from its buddings in the cradle to its efflorescence in school. It has been their work to collect and classify the memorabilia of infancy, the babblings of childish imagination, the first lispings of reason, to probe, already with edifying results, into the nature of instinct and the accretions of experience, into the enlargement of world-interest, the province of learning, the domain of action, the waxing and waning of habit, the influence of ideals, the formation of character. But they have been too enlightened to have entered on such an exploration without realizing the connection between body and mind, and they cannot have pursued it far without having had that connection, so mysterious, but indubitable, brought home to them in a multiplicity of ways. In the long, I had almost said the tragic history of childhood in the past, it has been the all but exclusive attention bestowed on the cult of the mind to the neglect of the body that has

been responsible for immeasurable suffering, failure, and futility. But we have awakened now to the obligation—the imperative obligation of studying both cults together and of correlating them as far as possible. Hygiene was to the fore. Athleticism was in the ascendant, and there was a danger that in some quarters the spiritual nature might be crushed out by the pampered exuberance of the corporeal. There can be no danger, however, in the unrestricted investigation of corporeal growth—an investigation which would, one of these days, result in the discovery of laws of universal applicability.

THE EXPERIMENTAL STUDY OF GENERAL INTELLIGENCE.

By CYRIL BURT, M.A.,

Lecturer on Experimental Psychology in the University of Liverpool.

[*Continued from p.* 45.]

We now turn from a consideration of the particular tests and their several results, to see what general conclusions we may draw.

Looking back over the results of all the tests, we see that the individual performances in the tests of higher mental processes show throughout a closer correspondence with individual intelligence than the individual variations in simple sensory thresholds, or in speed of simple movements. The correlations with intelligence yielded by the six higher and more complex tests are all above ·5; those yielded by the six simple sensory and motor tests are all below ·5. It is in the direction of the higher mental processes, therefore, that we must look for future intelligence tests.

In the experiments mentioned above the highest processes of all—the *Reasoning* processes—have been left untouched. Can we ever hope to test these? In answer to this let me allude to more recent work carried out, not at Oxford, but at Liverpool. Details I will not now give. I cite them simply to illustrate the probable lines of future research, and the incompleteness of the successful attempts made in the past. For the data I am indebted not only to the head master and the head mistress of two Liverpool schools, who allowed me to interrupt their time-tables with my instruments and machines, but also to several of the teachers and to many of my students for carrying out experiments where the experiments had to be done by some one other than myself. By their kindness I was able to obtain comparable data from girls as well as boys, from untrained as well as trained experimenters,

from younger children as well as elder, and from new tests as well as old. It is to the superiority of these new tests over the old, that I wish to draw your attention.

If you show me three words arranged thus :—

EATING : HUNGRY : : DRINKING : ——?

and if you ask me to supply a fourth word standing to the third word in the same relation in which the second stands to the first, I can only answer correctly after a brief reasoning process. It is a problem in proportion or rule of three ; but it is rule of three, not in numbers, but in words and ideas. Further, it is a problem not depending upon special training, special knowledge, or memory of special facts acquired from particular lessons. I may not have worked arithmetical problems for a dozen years, but I shall not be penalized. On the other hand, I may have taught nothing but rule of three all my life, but I shall not be favourably handicapped to any unfair degree.

Again, you may say to me, "Tell me whether the following inference is right or wrong—does the argument make sense or no?"

The criminal committed a crime ;
The magistrate committed the criminal ;
Therefore, the magistrate committed the crime.

To answer correctly I must make an effort to reason, and success does not require any special knowledge which I (or other children) are not likely to possess.

Such problems in proportion, such syllogisms may be printed by the hundred upon sheets of paper and worked by a whole class of children at once, or they may be typed upon ladies' visiting cards (which are pleasant to handle and easy to deal) and sorted by each child individually into piles of right and wrong. In the first case you may mark the number done in ten minutes ; in the second case you may mark the time taken to deal ten, twenty, or thirty cards. Or, instead of collecting thirty or a hundred problems which every child can do without a mistake (no easy matter), you may make them a little more difficult, and mark by correctness of answer instead of quantity done.

When carried out in these ways, Reasoning tests seem to give correlations with intelligence as much superior to the Alphabet or Spot Pattern tests, as these are to the simple Dealing or Tapping tests. The reliability of those that have as yet been devised proves rather low, this, however, we may hope to obviate by further refinements of material and method in the course of research. Further, the differences due to sex are much smaller, perhaps non-existent in the higher mental

levels, while in the lower mental levels they are frequently large. Finally, the higher tests lend themselves more readily to reliable work in the hands of the psychologically untrained observer than the tests of the simpler processes, which usually require a special instrument and a special technique.

We reach, then, this important belief: the highest mental processes form the field which the near future has to explore for its most hopeful experimental tests. Meanwhile, let us see how successful are the combined results of the tests we already have.

Of the twelve tests employed in the Oxford Experiments, six, we have seen, gave correlations with intelligence below ·5; six gave correlations with intelligence above ·5. Let us amalgamate the results of the better six. On making a grand average of the six gradings furnished by these higher tests, and arranging the boys accordingly, we obtain a list correlating with the head master's order to the extent of ·85 at the Elementary School, and ·91 at the Preparatory. It is interesting to note that where there were big discrepancies between the estimate given by the master and the estimate given by the tests, the subsequent history of the boys usually verified the findings of the tests rather than those of the master. Thus one boy, excellent at the memory tests and at none of the rest, fell six or seven places in the master's estimate during the next twelve months. Another boy, a quiet and reticent child, was ranked high by the tests, but given only a mediocre place by the master because he could find nothing in his favour nor yet against him. In consequence of the test results this boy was tentatively promoted, and the promotion, I have been recently told, was afterwards remarkably justified.

What, then, is to be our general conclusion as to the possibility of testing intelligence by the tests we have hitherto tested? It is this. *By means of some half-dozen brief experiments, we are able independently to arrange a group of strange boys in an order of intelligence, which shall be decidedly more accurate than the order given by scholastic examinations, and probably more accurate than the order given by the master, based on his personal intercourse with them during two or three years, and formulated by him with unusual labour, conscientiousness, and care.*

I turn, in conclusion, to the two important problems which I mentioned at the very outset. Firstly, what is really meant by General Intelligence? Secondly, is there such a thing?

In discussing these questions, let me remind you of a couple of important distinctions. Some people, as we know, may be born capable; others are made capable. Again, some people may appear capable at one thing and prove quite incapable at another; others appear *capable*

du tout. We have thus to distinguish, firstly, between capacities that are inherited or innate on the one hand, and capacities that are acquired or learnt on the other; and, secondly, between capacities applicable in one direction only, and capacities applicable in several directions, or even in all.

The capacity to do well at an examination in multiplication sums depends mainly upon a knowledge of the multiplication table and a mechanical facility in manipulating figures in accordance with definite rules. It depends upon memory and practice; it is a capacity acquired. But there are capacities which will assert themselves in the absence of all training and knowledge, or in spite of them; they may appear spontaneously in a man like Napoleon, who rises suddenly from the ranks of the insignificant, or they may appear time after time in the same family—like the musical capacity of the Wesley family, or the scientific capacity of the Darwin family. Such capacities we name 'inborn.' When we are measuring what we call intelligence by means of experimental tests, are we measuring something acquired or something inborn?

The second distinction I may illustrate by a favourite antithesis of Carlyle's. In *Heroes and Hero-Worship*, he opposes "varieties of aptitude" to "fundamental greatness,"—the "vague capability of a man who could be any kind of a craftsman." "The true hero," he says, "can be Poet, Prophet, King, Priest, or what you will, according to the kind of world he finds himself born into. I confess," he adds, "I have no notion of a truly great man that could not be *all* sorts of men. . . . True, there are aptitudes of nature, too. Nature does not make all great men, more than all other men, in the self-same mould." We are, therefore, to avoid confusing two kinds of capacity: on the one hand, general capacity, like that of Julius Cæsar, or that of William Shakespeare—capacity which would have been successful no matter what tasks were imposed upon its owner by the circumstances of his life. "Shakespeare, one knows not what *he* could not have made, in the supreme degree." On the one hand, specific capacity, like that of Rembrandt, or of Chopin, on the other—capacity which was applicable specifically to painting in the one case and to music in the other, but to no other purpose. Psychologists have taught us that there is no such thing as a general faculty of memory, or of attention, or of suggestibility. There is, they say, only the fact that I remember this and that and not the other; only the fact can I attend to lectures, but not to sermons; only the fact that I am suggestible to electioneering posters, but not to advertisements for pink pills. Surely, it may be urged, intelligence is more multiplex and specialized than any other faculty we have or think we have.

If Jack and Jill are more or less intelligent, and Joseph is a fool, can we legitimately range them as items along a single scale? Perhaps reasonable Jack appears intelligent because he thinks before he speaks and after he has heard; restless Jill may be intelligent not by thought, but by intuition, not through patience, but from sprightlessness; half-starved Joseph, again, may be a fool simply because the ill-nourished condition of his brains and body makes him bungle everything he does or says. What warrant, then, can we have for believing that so-called intelligence tests test the same thing in the same individual, or that the same thing runs through them all, or is there to test?

These questions can only be satisfactorily answered on the basis of observations experimentally controlled and statistically evaluated.

Let us take the latter question first. Is there any one common and fundamental function permeating all the processes tested and therefore determining all their correlations both with each other and with it? To solve such a question mathematical methods must be used. One of the simplest is the method proposed by Dr. Spearman. If all the various modes and forms of intelligent activity, A, B, . . P, Q, etc., are saturated by some one all-pervading function, such as general intelligence may claim to be, then throughout the series—

$$\frac{\text{the correlation of A with P}}{\text{the correlation of B with P}} = \frac{\text{the correlation of A with Q}}{\text{the correlation of B with Q}}$$

To test our hypothesis, we must therefore calculate the correlation coefficients of every function tested or measured with every other such function. These coefficients are printed in Table II.; each figure shows

TABLE II.

HIERARCHY OF COEFFICIENTS (ELEMENTARY SCHOOL).

	Irregular dotting.	Alphabet.	Card-sorting.	Intelligence.	Card-dealing.	Spot pattern.	Tapping.	Mirror.	Sound.	Vision.	Touch.	Memory.	Weight.
Irregular dotting	—	77	67	60	69	57	57	50	52	48	38	20	16
Alphabet ...	77	—	74	61	66	59	54	29	52	16	62	31	07
Card-sorting ...	67	74	—	52	72	45	61	34	52	14	22	19	23
Intelligence ...	60	61	52	—	44	76	47	67	40	29	13	57	−13
Card-dealing ...	69	66	72	44	—	51	65	40	32	47	23	19	01
Spot pattern ...	57	59	45	76	51	—	41	41	47	25	03	26	11
Tapping	57	53	61	47	65	41	—	41	47	08	26	−05	22
Mirror	50	29	34	67	40	45	45	—	34	16	08	05	−05
Sound	52	52	52	40	34	47	47	34	—	−07	−01	01	−13
Vision	48	16	14	29	47	25	08	16	−07	—	26	06	18
Touch	38	62	22	13	23	03	26	08	−01	26	—	16	29
Memory	20	31	19	57	19	26	−05	05	01	06	16	—	05
Weight	16	07	23	−13	01	11	22	−05	−13	19	29	05	—

the correlation between the function named vertically above it and that named horizontally to the left. The order of each test in the series is determined by its general tendency to correlate as measured by the sum of the twelve coefficients it furnishes. It follows that if the functions measured are all specific forms of one common function, then the values should always become successively smaller as the eye travels across to the right or downwards to the bottom.

Such an arrangement is termed a Hierarchy. It will be seen that the figures tend to obey the requirements with remarkable consistency. It can be shown mathematically that the observed figures, given in the table, deviate from the ideal values by an amount which is just what should be expected by chance from experiments carried out on a sample group of the size chosen.

We may conclude, then, that there is a general function—a greatest common measure—permeating, to a greater or a less extent, the various special functions measured by our tests, and that they are not completely isolated and absolutely independent facts; that the measurements obtained are measurements, more or less indirect, of a single capacity, and not determined purely by different capacities in different cases; that the notion of an all-round mental efficiency applicable in many directions, is a legitimate conception; and that the higher capacities, such as those measured by the dotting, sorting, and alphabet tests, and the feature estimated by the master under the denomination of Intelligence, are the characteristics into whose correlations this mysterious, all-pervading, but legitimately conceived capacity enters most of all.

Is this all-round efficiency acquired by all-round training, or is it inborn—perhaps inherited from the all-round efficiency of the parental mind?

To answer this question we must compare the performances of the two schools. There was no doubt that the general mental efficiency of the parents of the Preparatory School boys was far superior to that of the parents of the Elementary School boys. The former included university professors, college lecturers and tutors, bishops, members of the Royal Society, and were—almost without exception—men of eminence in the intellectual world. The parents of the Elementary School boys were mainly small tradesmen—paying ninepence a week for their sons' education—sufficiently well-off and sufficiently interested to have prevented ill-nourishment, neglect, or poverty injuring their children's mental development; and yet, on the average, presumably far below the average intelligence of the parents of the Preparatory Group. On the other hand, it can cast no slur on the Preparatory School to say

that, preparing the boys for classical or mathematical scholarships at public schools, the training given must of necessity have been far more specialized than the all-round training afforded by the encyclopædic curriculum of the Higher Elementary School. Which group, then, profited the most—the Elementary boys by their general training, or the Preparatory boys by their parents' ability?

Let us compare the average measurements of the two groups. The following table contains a list of the tests with the unit of measurement employed for each, and the average achievement of the boys of the Elementary school and the boys of the Preparatory school respectively, with the mean variation of the individual measurements about the average of each group, and states which group was superior or inferior in each test. The validity and size of this superiority the reader can

TABLE III.

Test.	Unit of measurement.	Average for Elementary School.	Average for Preparatory School.	Superior School.
Touch ...	Least perceptible distance in millimetres	36·2 ± 9·0	38·9 ± 11·0	Elementary
Weight ...	Least perceptible difference of weight in grams	8·7 ± 1·5	9·3 ± 1·6	,,
Vision ...	Average error in centimetres	0·4 ± 0·1	0·3 ± 0·1	Preparatory
Sound ...	Smallest perceptible difference of pitch in vibrations per sec.	6·0 ± 1·9	3·5 ± 2·2	,,
Tapping ...	Number of dots tapped per sec.	80·5 ± 8·0	95·5 ± 11·9	,,
Card-dealing	Number of secs. taken to deal 50 cards	31·6 ± 5·9	27·3 ± 1·8	,,
Card-sorting	Number of secs. taken to sort 50 cards	48·1 ± 4·1	41·3 ± 4·1	,,
Alphabet-finding	Number of secs. taken to find 26 letters among 52	91·0 ± 15·4	74·0 ± 13·0	,,
Memory ...	Each word correctly remembered counts 4	134·2 ± 27·7	216·0 ± 29·0	,,
Mirror ...	Number of secs. taken to trace pattern 6 times	388·9 ± 90·1	257·0 ± 54·0	,,
Spot pattern	Number of exposures required for correct reproduction of pattern	45·3 ± 21·1	38·6 ± 12·5	,,
Irregular dotting	Number of dots tapped per sec.	84·0 ± 11·0	85·0 ± 14·0	,,

readily determine for himself by a comparison of the figures themselves. Thus, in the case of the Alphabet test, the Preparatory boys were on an average 17 secs. quicker than the Elementary boys (91 − 74 = 17). Compare this with the mean difference of the individuals from the average of their group (15·4 in the case of the group of 30 boys, or 13·0 in the case of the group of 13). The difference between the two groups (17) is decidedly larger, but not so large as in the case of the Memory and Mirror tests, where the boys of a given school resemble each other much more closely, and differ from the boys of the other school much more widely.

It will at once be observed that, with two exceptions, the average performance of the boys of the Preparatory School are all superior to those of the boys of the Elementary School. Further mathematical calculation shows that in most tests the average of the entire Preparatory School group (13 boys) is superior even to that of the cleverest subsection (7 boys) of the Elementary School group. The two exceptional cases in which the Preparatory boys are inferior are the tests for discrimination of weight and discrimination of two points by touch. These two are precisely the tests, and the only tests, which yielded negative correlations with intelligence. Hence, wherever a mental process is correlated with intelligence, there (so far as we know) boys of superior parentage resemble their parents in being themselves superior.

Is this resemblance inherited or acquired? In other words, how far is the superiority of the Preparatory boys attributable directly to superior birth and parentage, and how far is it due to superior training and superior home environment, acting subsequently to birth?

A careful consideration of the circumstances of the two sets of boys and of the nature of the tests seems to show that, unlike proficiency in examinations, proficiency in the tests depends only to a negligible extent upon acquisition of knowledge, upon previous special practice, or upon an acquired adaptability of the mental attitude in general. Upon this I will not enlarge. Experimental evidence alone may here be cited.

The test which yielded the best results, the Alphabet test, was applied to a group of over 60 boys ranging in age from 10 to 16. Age may be taken as a measure of the extent to which post-natal or environmental factors likely to influence intelligence operated; the older the boy the greater the amount of training his mind must have acquired from his individual experience. The measure is probably exaggerated because the mental powers will probably have undergone considerable

spontaneous development as well. What, then, is the correlation between proficiency at the Alphabet test and Age? In the group tested it was ·29. Hence the relation between the mental process tested by Alphabet-finding and amount of general experience must be smaller still; and, compared with the relation between Alphabet-finding and intelligence, must be negligible.

All the tests were repeated some twelve months later, upon as many of the boys originally tested as were still at the school or could be traced. The conclusion was the same. There appeared little or no relation between improvement or deterioration in the functions tested and the features of the new occupations or of the new schools of the boys who had left, or the progress in class of the boys who remained. Indeed, while the mental acquisitions of the boys had enormously increased, the faculties tested in nearly every case had remained stationary.

For these various reasons we seem bound to conclude that the superior proficiency at intelligence tests on the part of the boys of superior parentage, and the inferior capacity manifested by the other boys were in-born. From this, again, we may infer that general intelligence is innate.

I venture to think that these theoretical conclusions as to the nature and existence of general intelligence are quite as important as practical conclusions as to the possibility of measuring its degree. We find, firstly, that there is such a thing as general mental efficiency; and, secondly, that such general mental efficiency may also be innate. To the conception of general innate efficiency of mind, thus reached, we may, I think, fairly apply the phrase "general intelligence or ability." And thus we have reached a definition of our term and a demonstration that a corresponding reality actually exists.

If you ask how we are to picture the basis of a mental trait so general and capable of biological inheritance, I can only suggest that we may perhaps identify it with some developmental tendency to systematic structure in the central nervous system or "brain." Every process involving attentive consciousness depends on the presence in the brain and spinal cord both of systematically organized neural connections—or open nerve-paths, and of unorganized nerve cells and fibres—nerve-paths waiting to be opened, connections not yet made. The former constitute the basis of inherited reflexes, of instincts, and of habits and memories due to experience in the past; the latter when organized will form the basis of the memories and habits of the future, and meanwhile furnish the possibility of an ever-changing adaptation to an ever-changing environment. This adaptation is the prime function of

attentive consciousness, of intelligence, of mind. Hence the more appropriate (that is, the more complex, the more systematic, the better organized) the adaptation, the more efficient will be the mind. A mind, therefore, will be most efficient where the tendency to systematization in the portions of the brain yet unsystematized is greatest, where the inborn capacity for complex organization in the nerve-material yet unorganized is the richest.

Such a tendency, such a capacity can readily be pictured as dependent on the general architecture of the brain itself, and being at bottom structural, it can, like all structures, be conceived as inheritable.

Our final conclusions, then, may be summarized as follows :—

General intelligence exists, is definable, and can be measured. It can be most readily measured by tests of the higher and more complex levels of mental activity. It may be defined as *all-round innate mental efficiency;* for excellence at these tests and at tests like them proves to be the expression of a mental property neither merely specialized nor merely acquired, but something all-pervading, something inherited, something inborn. Lastly, we may have no hesitation in assuming that such a capacity exists; for its basis may be pictured as a tendency to integration in the structure of the central nervous system; and hence that child will be the most generally intelligent who inherits a brain which has been throughout laid down for development along the most systematic lines.

These conclusions are, it is true, still largely hypothetical. But they form a hypothesis which is founded upon experiment. And by experiment alone can they be firmly established, fully extended, or finally overthrown.

THE PHILOSOPHY OF BOYS' GAMES.

By FELIX CLAY, B.A.

A Paper read before the Child Study Society, London, November 17, 1910.

The line between play and games is not very easy to draw; games are, of course, a branch of play; all games are play, but all play is not a game. Roughly speaking, the distinguishing feature of a game is that it requires more than one person, has a more definite scheme, is governed by rules more or less elaborate, and, in particular, that it has

a definite object to be secured over and above the immediate enjoyment of the exercise of skill and activity. When, in addition, one speaks of "Boys' Games" the inference is that we mean particularly games played by a number, formed into teams or sides—such as cricket, football, hockey, etc.

The value of games educationally is too widely recognized at the present day to make it necessary to add one more to the numerous pleas being continually urged in their favour, and I wish this evening to discuss certain points which help to explain their great value and wide popularity; and to consider them in relation to the development and growth of the individual.

Play in some form or other persists as long as life, but its development falls into three very characteristic periods, though they cannot be sharply divided. An American writer published a few years ago an interesting table in the *Pædagogical Seminary* (1908), in which he suggests that the periods of succeeding development roughly correspond to the years from birth to seven, from seven to twelve, and from twelve to adult, though there would be a very wide difference in different individuals.

Generally speaking, it is not until about the end of the second period that there is any real tendency to games that require co-operation; the earlier play is more individualistic, aiming chiefly at personal pleasure or success, and only gradually is the sense of self-subordination for the good of a side developed.

It may be of interest shortly to trace this progress; of course, each succeeding period does not mean a *change*, but an addition grafted on to the previous one, and the features of each period persists in various forms through life.

In the first seven years, then, we have in an ascending series from babyhood—body movements, kicking, gesticulating, grimacing, cooing, crowing, babbling, shouting, dropping things, playing with boxes, sand, etc., running, jumping, climbing, rocking-horses, swinging, playing with hoops, tops, etc., which pass on in later life into such subjective and individual forms of amusement as sailing, rowing, swimming, and gymnastics. As the child gets older, the instinct of construction appears with the desire to make things; cutting, digging mud-pies, drawing, modelling, using scissors and tools, carpentering, passing on into the love of machinery, craftsmanship, etc. At about the age of seven, earlier or later, according to the particular child, comes the beginning of games proper, in which we at once notice certain instincts showing themselves strongly, the instinct of power or self-assertion and the various old instincts that secured success in war and hunting. In

games like hide-and-seek, king, Jack's in his castle, hare and hounds, paper chase, touch last, and so on, we see the influence of the latter—while the strongly emulative feature in all games of skill, which becomes more and more marked, and lasts as long as life, shows one of the most important of all the survival instincts—the need to get the better of the competitors in life's race. This is a very noticeable feature in the innumerable tests and games that boys invent by the hundred to show that they can do something better than their neighbours. In fact, it is impossible not to recognize that the real attraction for boys, not only in their games but in most of their pursuits, lies to a very large extent in this spirit of emulation and the chance of its gratification, each boy is stimulated by it to do his best, to develop to the highest possible point his strength, quickness and agility, his accuracy of hand and eye, his skill in doing difficult things. When the teacher tries to banish emulation from the classroom, he should look at the games; all the savour would disappear, as, indeed, it would from much in life, if it were possible, as it certainly is not, to banish the pleasure felt in doing something better than other people, in a word, in beating some one or something. We can teach it to take more subtle and more suitable forms; we can teach it moderation and so train the boy as to desire to excel in worthy directions, but to eradicate it by providing no opportunity for its display is a hopeless and impossible task. A Nature-study walk, for example, substituted for the school games, frequently only means a game of another kind, as each boy vies with the others as to who shall find the most or the rarest objects. I do not think that games so much foster the spirit of rivalry as they do provide opportunity for understanding and controlling this strong instinct. The boy who grows up without having had a chance of certain instincts showing themselves is in a dangerous position; he does not know himself, and is not on his guard, and has had no experience in controlling them.

It is interesting to note that the spirit of rivalry is generally far stronger in girls' schools, where there is not generally so free an outlet in games, than it is in a boys' school.

In these years, after seven or eight, are laid the foundations of the love of field sports—hunting, fishing, shooting; and all kinds of personal contests—boxing, wrestling, fencing, etc. Somewhere about the age of twelve we begin to notice the effect of the gradually developing social instinct; there is a desire to act in company, to form bands and groups. In games, those that are played by teams become the most attractive; the desire for individual success is modified, or rather complicated, by the desire for collective victory. The

honours of the team or group, the school, or the county, becomes the paramount interest. The emphasis gradually shifts from the complete self-concentration of early years on to the self in relation to others.

We see in this very clearly the traces of what is quite obviously a later development in human progress when tribal action took the place of individual effort, as the scattered family units each carrying on a life-and-death struggle for its own existence began to join together, thus gaining the enormous advantage of concerted action and co-operation. Natural selection would rapidly bring to the front, and thus increase, those tribes in which the individual units showed a tendency to self-subordination and loyalty to a chosen leader, so that such qualities, while of a higher order and later development, would tend to become very strong and deep-seated instincts.

It is this social instinct that adds such a deep zest to contests in which teams take part, such as cricket, football, hockey, baseball, etc., and in later life to all kinds of concerted actions by bodies of people for particular purposes. In war it plays, of course, a large and highly important part in producing what is known as *esprit de corps*, which seems to arise so naturally from public school life. The most marked feature of these games which are played by teams lies in the subordination of the individual for the good of his side, a complete and ungrudging self-effacement and unselfishness, and these qualities as a rule do not really begin to develop until a boy reaches a certain age. Of course, young boys do play these games; but I think any one who has watched small boys playing will have noticed the strong tendency that each has to consider the game as an opportunity for individual prowess; and though he can be, and is, taught to consider it good form not to show off selfishly, or to play for his own hand, it is very doubtful whether he has the real feeling of merging himself in his side to which we are alluding.

Of these three different periods, with their fairly distinct characteristics, the third evidently involves the possession of higher faculties than the preceding, and in it the germs of the altruistic and socially helpful tendencies.

It is very interesting to note how close the mental development, considered physiologically, corresponds to this series. I should therefore like to take up a few minutes in giving a short sketch of the direction to which the physiological psychologist is tending. Much of it is still in the region of conjecture, but experiments and observation all tend to show that in its main lines it is right.

The theory that I wish to describe as shortly as I can is known as the "level theory of the nervous system."

Modern investigation has now gone far beyond the conception of the nervous system as an undifferentiated unity such as "mind" is commonly considered; or that all our actions are simply directed by a single centre—the brain. Many actions which have every appearance of good sense are regulated within the spinal column; some from within the walls of the abdomen. The lower order of animals have no brain ganglia, the lowest vertebrates no cerebrum. As man contains in himself an epitome, as it were, of biological history, we ought to expect a nervous system of added parts.

Some thirty years ago Dr. Hughlings Jackson, in his investigation into mental disease, formulated what is known as the "three-level theory," and so useful has this been as a working hypothesis for operations on the brain and diagnosis that it has become a well-established basis.

Dr. Jackson conceived the nervous mechanism as existing of three systems one upon the other, the higher embracing the lower, yet each preserving a certain degree of independence. The lowest level is responsible for what are usually termed "reflex" or "involuntary" movements; the second or middle level regroups these simple movements by combinations and associations in wider and more complex mechanism, producing a higher class of movement. The highest level unifies the whole nervous system, and is, according to Dr. Jackson, the anatomical basis of mind. It was the anatomical location of these various portions of the brain which has made many successful operations possible. The theory is in the truest sense evolutionary, and we do clearly see these stages of development in the child; for the first year we see the reflex system at its highest activity, and during the second year the reflexes arrive at maturity, while the middle level system comes then into operation, gradually growing all through childhood, reaching its maturity in the years before puberty, while a little before, or about that time, there is again a marked mental difference, as the higher levels come into play. As a matter of fact, of course, these three periods have always been popularly recognized and distinguished. Infancy is the period for acquiring the automatic movements of maintaining equilibrium, walking, hand and arm training, which then become automatic and reflex. Childhood is the time for training the sense centres, while the period of dawning adolescence has always been looked upon as a time when new powers come into play. It is a common statement that a child is not capable of rational thought and reason until the age of thirteen or fourteen. In religion—witness our Confirmation Service—is the recognition that the child takes on the

adults' power of logical thought. The interesting point is that this is now supported by actual anatomical investigation. The researches of Flechsig and others go to show that certain fibres begin to develop in the brain at about the age of twelve, and it has been suggested that these so-called tangential fibres are connected with the higher power of logical thought that then begins to develop.

There is no need to insist upon any particular number of levels; there may be few or many, but this conception that the higher processes are formed by combinations of elements and structures of a lower process already existing, is a very helpful one in understanding the growth of the mind, and it is not forcing plausibility too far to see in their successive appearance the phases of development through which the race has passed. It helps too to explain how children sometimes persist in following savage interests foreign to our civilization. Upon this doctrine of development, these experiences, however strange and out of place, may be essential as a platform from which a higher co-ordination, useful for modern life, may be reached. The intermediate stage may be useless and harmful, but as a link in evolution it may be necessary. [From an article on the Development of the Nervous System by Bush in the *Pæd. Seminary*.]

I have tried to emphasize this point because it must have an important bearing upon our attitude towards the activities and development of the growing youth. We have, of course, got a long way off the old attitude of simply considering children as little men and women only differing from the adult in their lack of experience, but I doubt whether we have sufficiently grasped the importance of recognizing the succeeding phases of growth.

The instincts that we are chiefly concerned with this evening—that is to say, those that lead to and find their pleasure in group activity—are very potent forces for good or ill. One of their less satisfactory results is apt to be the production of gangs known in London as "Hooligans," in America as "Hoodlums," in Paris as "Apaches," unless provided with some suitable and harmless outlet. School games, of course, come to the rescue, and provide many opportunities for the proper and legitimate exercise of these natural impulses. Another side of the social instinct we may well believe provides the basis of the altruistic feelings, co-operation involves self-sacrifice, and it is in the games of play of the boy at this period that we often see the first unfolding of this instinct.

A striking feature of these activities in many cases is their tremendous force; they absorb every bit of energy that the individual can put forth, they become heroic, all-absorbing, filling the life physically

and psychically. Where the house or the school is concerned the individual self is completely forgotten, self-sacrifice or risk is welcomed if it will help in securing the longed-for victory. We have only to take the case of the boy at school, engaged in some house or school match, and the practice, etc., leading up to it, to see how exactly he is showing, on a minor scale, all the qualities and actions that would ensure victory to a tribe or race engaged in deadly conflict with another. When we see the vast importance of them to race survival, it is no wonder that natural selection has developed them to a high degree and bitten them very deeply into the character of the race.

A marked characteristic of these team games is their objectivity. They do, of course, involve subjective activity and expenditure of energy, strength, and skill; there is something difficult to do and worth the doing, and the pleasure in all this may be very great, but at the same time, it is only a means; just so, must the player control his temper, do what he is told with instant obedience, but everything is to be done in order to win the game. This is, of course, subject to the fact that many games are played purely as play for the mere pleasure at the moment and the exercise of the skill, but they are then play, they have not got the deep, inspiring thrill of the real contest with numbers on each side.

Boys will, of course, often work hard to gain knowledge for some particular purpose, or to gain various desired ends, but beyond all question, the activities that call out the highest and best in boy life, that rouse him to passionate enthusiasm, are those that appeal to this instinct for group activity, loyalty to his house, his school, his country. An objective end, not a personal and subjective advantage except in so far as he shares it with others. We have referred above to the obvious corollary of successful group activity, loyalty to a leader, and it is very interesting to see the strong propensity to hero worship which appears in the boy just about the same time as the dawning of the social instincts, which forms so marked a feature in boy life.

It is these deep-seated racial instincts that show so strongly in boyhood that go a long way to explain the instant and astonishing success of the Boy Scout movement; it is obviously from the result, one of those things that meets a really deep-felt want. It appeals to every instinct that a boy has. Every boy—who is a boy—has played at Indians, at war, and ambushes, made gangs, bound together by all sorts of secret understandings and purposes. It has again a dress or uniform of infinite attraction to a boy, it has only to be described, indeed its very name alone wins its way directly to his heart; it will be a most potent influence for good or ill; its inception was a stroke

of genius, and if properly handled it will prove of immense good. In its emphasis on courage, loyalty, discipline, self-sacrifice, mutual help, and so on, it has a chance of vast possibilities in directing these instincts that we are considering, not merely into harmless, but beneficial channels, providing, like the games at school, an opportunity of working out under suitable conditions, many of these instincts, that properly treated, form so splendid a basis upon which to build.

[*To be continued.*]

SUGGESTIONS FOR PARENTS AND TEACHERS.

The Common Drinking Cup.—In an article by W. A. Matheny, Clark University, U.S.A., in *The Pedagogical Seminary*, June, 1911, on the dangers of the common drinking cup, as used in schools, railway stations, public places, etc., the following conclusions are reached: "(1) Science offers clear and positive evidence that living virulent pathogenic organisms are transmitted from mouth to mouth by means of the common drinking cup. (2) Sentiment against the use of the public cup is spreading rapidly. Laws abolishing it have been passed in at least seven states. (3) The bubbling fountain and the individual cup are being used in place of the common cup. In schools the former gives better results, and should be maintained where it is possible to have it." It is said that the ordinary washing of cups, dishes, glasses, etc., has little value in getting rid of living organisms; but "efficient disinfection can be obtained by allowing the utensils to remain five minutes in water at 50° C. Evidence of the tubercle bacilli even appeared after this method was employed. Washing in boiling water for one minute gave satisfactory results, as did also washing in water at 50°, to which had been added two per cent. of carbonate of soda."

A Hint to Sunday School Teachers.—Mr. John Hornby, in his little book entitled "The Master Word of Sunday School Reform," points out the wrong done to a child in "the endeavour to make him even in religious matters 'a little man.' . . . To hear children of five joyously singing 'We're not too young to sin, We're not too young to die'; boys and girls of ten years old singing 'Weary of earth and laden with my sin'; and great, strong lads of fifteen declaring in a melancholy and quavering bass that 'we are but little children weak,' is surely enough to make angels weep. There are many hymns, beautiful

and exactly suitable for later years and times of fuller spiritual insight, but let us fit them to that time and point of spiritual discernment, and not to an earlier and quite unsuitable time. . . . In the first and second sevens [years] the music should be bright and swinging, should catch on the bound the gaiety and momentum of youth, and not be in the nature of a drag, or as something hostile to the whole joyous sentiment of the child's life. When the adolescent stage is reached, and voices are for a time unwieldy, the tunes, though firm and strong in character, should be steadier, more deliberately melodic, well within a medium range, and of the chorale or plain song character."

The Child and its Environment.—"All of what may be called the higher environment of right teaching, moral example, etc., are largely dependent for their success on the effects of the lower environments of good food, fresh air, play, sunshine, etc. . . . It is specially the case that animal spirits, joy, a tendency to laughter, and such an excess of the faculty of energizing that the child feels organically happy, and *must* laugh and romp—those depend on health and nothing else. . . . The environment which tells for good or evil consists not merely of the great and important things of life, but also the small things and accessories. It is not only the food and raiment, but those things that some utilitarian people would call non-essential, that tell—green grass and trees, access to the country and hills, nicely kept gardens and flowers, neatness and order in the things of life, good, well-kept streets, fine public buildings, clean, well-fitting clothes made of suitable texture, some music, some art, some leisure, some pleasant social intercourse, and some games."—*Dr. T. S. Clouston*, in his pamphlet on "The Mental Effects of a Child's Environment."

Child Neglect.—"I look out of my window and see a troop of little children tumble turbulently down the steps of the adjoining house. They form a selection from the various families quartered there. The effect of overcrowding is clearly written on their pallid faces; the evils of malnutrition are revealed in small and stunted bodies, in twisted and rickety legs. Their tattered and sorry clothing testify to the presence in the home of poverty or neglect, or the two combined; their rude manners and noisy shouts indicate the absence of a mother's training. A luckless baby, with features puckered like a monkey's, is rigidly fixed in a 'go-cart' and tended by a little girl some six years old. Considering its uncomfortable position, the continuous shrieks it utters are no cause for surprise. . . . The small attendant produces from a dusty pocket some gelatinous and deleterious compound, and thrusts it into the infant's mouth. Peace reigns, doubtless ere long to be broken

again by the protest of an outraged and indignant infantile digestion. I know that in the neighbouring streets a similar picture may be seen; I am aware that the same tale can be told throughout the next parish and the next borough, and I have little curiosity concerning the exact numbers. They are sufficiently large to attract attention, sufficiently menacing to challenge reform."—*Reginald A. Bray, L.C.C.*, in "The Town Child."

The Heating of Schools.—*Dr. W. Lewis Thompson* in an article on this subject states the following conclusions: "(1) Heating by hot pipes is the most satisfactory method. (2) To heat the required amount of fresh air, with the low pressure system, 5·7 square feet of pipe-surface, or 4·8 lineal feet of 4-inch pipe per child, are necessary in cold weather. (3) Distribution of heat by hot pipes is more efficient than by radiators. (4) Radiators as ventilating agents are unnecessary, and as far as schools are concerned are practically useless."—*School Hygiene*, August, 1911.

The Practical Teacher and Child-study.—"Personally making some methodical observations, or some experiments upon his scholars . . . should prove fruitful [to the teacher] from a threefold point of view: first, in that it will bring a valuable contribution to paidology, since educators are in a much better position than any one else to study the mentality of the child. Such researches have, moreover, an immediate utility for teaching, since, as we shall see later on, the majority of the experiments in school psychology furnish for the master useful didactic data, of which he is able to make immediate use. I am certain, in the third place, that the fact of giving his attention to the solving of various problems will give to the head of an institution, to whom the task is often laborious, a renewed interest in his teaching. He will see things with other eyes, and his conceptions will be enlarged; behind the manual, the time-table, and the examination he will more clearly see the pupil; and he will study with greater interest, when he is familiar with the problems which are connected with it, the development of each of the little individualities which are entrusted to him."—*Professor Ed. Claparède*, in "Experimental Pedagogy and the Psychology of the Child" (English translation).

Teaching Bad Manners and Bad Morals.—"A woman who would not lie to a grown friend will lie freely to her own child. A man who would not be unjust to his brother or a stranger will be unjust to his little son. The common courtesy given any adult is not given to the child. That delicate consideration for another's feelings, which is part of our common practice among friends, is lacking in our dealings

with children. From the treatment they receive, children cannot learn any rational and consistent scheme of ethics. Their healthy little brains make early inference from the conduct of their elders, and incite behaviour on the same plan; but they speedily find that these are poor rules, for they do not work both ways. The conduct we seek to enforce from them does not accord with our own conduct, nor form any consistent whole by itself. It is not based on any simple group of principles which a child can understand, but rests very largely on the personal equation and the minor variations of circumstance."—*Mrs. Charlotte Perkins Gilman,* in "Concerning Children" (sixpenny edition).

NOTES.

Our Halifax Conference.—Miss Cash, the Asst. Hon. Gen. Sec., writes: "The Annual Conference of the Child Study Society was held at Halifax on July 13, 14, 15. On Thursday evening it was opened by a reception given by the Mayor and Mayoress of Halifax, after which a presidential address on 'Growth, Somatic and Cerebral,' was delivered by Sir James Crichton-Browne, the President. There was a very large gathering at the reception, the room in which it was held being full to overflowing. At the Council meeting held early the next day, some of the old faces one hoped to see were absent. In fact several circumstances seemed to threaten the complete success of the Conference. Miss Louch and Mr. Mulford, the Hon. Gen. Secs., who have done so much for the Society, and whose presence must be valued by all those who know them, were unavoidably absent. Dr. Clonston, of Edinburgh, who was to have delivered an address, was unfortunately obliged to put the claims of the House of Commons before those of the Child Study Society, and was unable to come to Halifax. But in spite of various difficulties, the Conference was very successful, and this was, no doubt, in large measure, due to the untiring energy of the Honorary Secretaries, Mr. Arrowsmith and Mr. Ratcliffe. Dr. Scharlieb's most comprehensive and suggestive paper on the 'Adolescent Girl' unfortunately allowed too little time for adequate discussion and criticism. Those who heard Mrs. Mumford's eloquent address could not fail to have been impressed by the fact that she was speaking of what she had lived. It was not mere theory, but vital experience gained through contact with the adolescents of her own home. Her coming to Halifax was especially appreciated by those who knew that she had done so in spite of great anxiety owing to the illness of one of her children. Those of us who came from a distance and accepted the hospitality of Halifax people, find it difficult to express our thanks to them for their warm-heartedness and good fellowship."

Mr. Arrowsmith writes: "The Halifax Conference was an unqualified success. The attendance, the papers, and the discussions were all good. The original programme had to be modified slightly because of Mrs Ogilvie Gordon's presence on the Friday at an important meeting in London. Mrs. Mumford, of Manchester, author of 'The Dawn of Character,' very kindly filled Mrs. Gordon's place. Mrs. Gordon gave her address in conjunction with Mr. Legge of Liverpool on Saturday morning. The visit to the Bermerside Open Air and Special School was greatly

enjoyed by all the delegates. The Halifax Society are much indebted to the speakers for the eloquent, and thought-provoking papers."

The Brussels Conference.—Mr. T. G. Tibbey, who attended as the official representative of the Child Study Society, sends us the following sketch :—"The First International Congress on Paidology was held at Brussels, August 12 to 18, 1911. Future years will tell how far this new venture will be justified by its fruits ; its subject-matter is of sufficient importance to receive international consideration, but much will depend on the wisdom of the organizers and the measure of support they receive. Here something was lacking ; though every country in Europe, and both Americas, with Japan, Cuba, and Mexico, were represented, the numbers of members from Great Britain, France, Germany, and the United States were quite inadequate to the educational importance of these countries, whilst some notable names of European reputation were missing. The representative of the Child Study Society was the only accredited British representative, and as such spoke for England at the opening congress ; only one member of the English committee was present, and only one Englishman—and he a Scot domiciled in London—attended in person to read his paper. There were also three Scotch lady members, one a member of the Edinburgh Child Study Society. Unfortunately but few of the papers presented had been circulated before being read ; this, together with an overcrowded programme, a tendency on the part of some speakers to occupy too much time, and an occasional lack of order at the meetings, tended to kill discussion. Such faults, however, are not uncommon at congresses, and can be remedied by better organization. The time limit to speakers should be rigidly enforced, and the golden rule to speak slowly and distinctly when addressing others to whom your language is foreign should be impressed upon all. The subjects discussed covered a wide range—perhaps too wide a range—and were generally of sufficient importance to have merited more attention than they received ; we hope to refer to some at greater length in later issues of *Child Study*. Quite apart from the many new ideas and points of view which the members of the Congress could not fail to carry away from the various meetings, it was their own fault if they did not spend a pleasant, albeit a hot and busy, time. Brussels, Antwerp, and Charleroi united to do them honour, they had the opportunity of meeting in social intercourse many folk from other lands, and their best thanks are due to the never-failing courtesy of Dr. Decroly, the acting President of the Congress ; to the driving force of Dr. Schuyten, the chairman of the committee ; and to the skill with which Mdlle. Dr. Ioteyko, the Secretary, and her many assistants carried out the arrangements for the comfort of those present."

Lecture Lists of the Societies.—BIRMINGHAM : Dr. W. Jordan, Miss Field, Mr. H. Holman, and Mr. Frank Jones, B.A. (on "The Teaching of English") will lecture, and the probable dates are :—October 17, November 21, December 12, January 23, February 20, and March 19. CHELTENHAM : Miss Hubback will give the first lecture, which will be on "The Teaching of History in the Elementary Schools." HALIFAX : Ten meetings will be arranged, four or five of which will be taken up with discussions on such topics as scholarships, curricula of elementary and secondary schools, sleep, fatigue in school-children, etc. LONDON : October 12, The Hon. George Montague, on "The George Junior Republic" (refreshments after the meeting) ; October 19, Dr. A. Beresford Kingsford, on "Psychology of Co-Education during Adolescence"; November 2, Mr. H. Holman, M.A., on "Psychology and Grammar" ; November 9, Professor W. Rippmann, on "Psychology of Speech" ; November 23, Mr. T. G. Tibbey, B.A., on "Psychology of Reading" ; December 7, Professor W. Brown, on "Psychology of Mathematics"—all the lectures are on Thursdays at 7.30 p.m. MANCHESTER : October, "Reforms in Geography Teaching," by Mr. J. Erskine (South Manchester Grammar School) ; November, "The Teaching

of the Deaf," by Mr. Barker (Royal Deaf Schools, Old Trafford); December, "Art Teaching," by Mr. Shelley (Manchester University); January, "Investigations on Precocity in Children," by Dr. Mumford; February, "Discussion on Punishments," opened by Professor Findlay; March, "Food in connection with Children's Idiosyncracies," by Dr. Catherine Chisholm.

An Enquiry.—A correspondent sends the following note of enquiry: "Friends in India are anxious to make a systematic study of Asiatic children, especially at the adolescent period. I have been asked for suggested Schemes of Enquiries, that could be adapted to Indian requirements. Can you refer me to any book or other publication containing a record, or of any questions that have been scheduled concerning English or other children? I should be grateful for names and addresses of any to whom I could write for information." Will all who can help please write to W. J. Durrie Mulford, 90, Buckingham Palace Road, London, S.W.?

Our next Conference will be held in London during May, 1912. Any society or individual member is at liberty to suggest to the Council a topic for the Conference. So far the following topics have been suggested: The Psychology of School Subjects; The Development of Imagination; The School Clinic in Relation to the Mental and Physical Development of the Child. Any suggestion should be forwarded to Miss Louch, or Mr. Mulford, before Oct. 12.

CORRESPONDENCE.—Co-Education.

Sir,— Your correspondent, Mr. Coed, asks for letters giving the personal testimonies of those who have undergone a co-educational course, and I should like to send him mine. Although still a minor, I venture into the discussion because I feel that there cannot be, up to the present, many older people who have had the experience of a co-educational training in England.

One of the first reasons which makes me glad to have been brought up in this manner is that I think I feel more at home in the world than I find other girls do who have been brought up among girls only. It is difficult to say how much of this is due to the all-round rational education, and how much to the being boys and girls together, but it seems to me largely due to the latter.

The boys and girls who have been brought up together in their families seem to be more at ease in their surroundings than those who have not always lived together. Where this advantage is extended to school life, the boys and girls seem still less shut off from outside interests, and though they look on school as thoroughly interesting and not merely as a stage to be got through, yet at seventeen or eighteen they are more anxious to get out into the world in which their interest has been thoroughly aroused than children from unmixed schools. In these schools the children are not keen to leave, because they have, at seventeen, little or no interest in anything but school, and when the time comes to leave, feel cast out and try to hang on to old associations as long as possible, or go from school to something as nearly like it as possible, and with a feeling of liking life arranged for them, would rather go abroad to "finish" than find a footing for themselves from their own homes.

This is a feeling expressed by girls whom we meet at sports in their own schools, and it seems to arise from a want of proper stimulus in schools, which is not lacking where boys and girls are together.

I. de C.

Sir,—In reply to Mrs. (or Miss?) White Wallis, may I suggest that for the purpose of a preliminary discussion the age period of adolescence may be conveniently, though

arbitrarily, taken as extending from the commencement of the fifteenth to about the middle of the eighteenth year. Few young people remain at school, as distinguished from college, for any length of time after they have completed their eighteenth year.

I venture to think that co-education during this very impressionable period must be considered as part of the preparation for life rather than for the next two or three years of life. It is rather difficult to follow A. Coed's argument that family life proves both the possibility and desirability of co-education because an important condition of family life is absent from school life. The question is how much co-education will remain when "all the fundamental needs" of the individuals of both sexes, and of the State as a whole, have been met? I hope, sir, we shall have in the near future personal testimonies from those who have carried out, or been subject to, co-education during the period of adolescence.

BERESFORD KINGSFORD.

REVIEWS.

Archives de Psychologie. July, 1911. Williams and Norgate; 3 fr. 50.

In this issue M. Edmond Cramoussel continues the investigations into the sleep of a baby begun in an earlier issue—now from 3rd to 6th month. Both the curves and their explanation are interesting and reveal much that might not be expected, whilst agreeing with much that can be observed by watching; whether they also record, as M. Cramoussel suggests, a mental activity differing from that of waking life, but with perceptive faculties not less acute and a practical judgment not less rapid and sure—this is matter for further investigation.

M. J. Varendonch gives an interesting account of some investigations he made into the evidence given by children called as witnesses against a man charged with murder, to show how largely it was based upon suggestions made by others. We are not told the result of the trial, but it is evident that his inquiries received scant courtesy at the hands of the president of the court who seemed skilled in combining rudeness with ignorance. A further article deals with suggestibility in adults, whilst a valuable review of psychopaidology touches upon many books published of late which had not received a fuller notice. T. G. T.

L'Educateur Moderne. July, 1911. Paulin & Cie. Paris.

In this issue M. R. Cousinet again takes up the question of the contents of the reading books provided in French elementary schools, and in reply to his critics urges the dangers of offering moral lessons so insistently in them, and attaching such lessons to stories manifestly unreal. Dr. Victor Pauchet gives some account of the success of the "New Thought" imported from America, and not unknown in various guises in Britain, in strengthening mentally and spiritually enfeebled adults.

T. G. T.

The Sensitive Child, as revealed in some talks with a little boy. By KATE WHITING PATCH. Pp. 91. London: H. R. Allenson, Ltd. 1s. net.

This small book contains good, bad, and indifferent matter. There are many hints relating to the mental and physical care of children, and especially of an abnormally sensitive child, which are of real value, illustrated by actual instances, and are clearly and convincingly put. But much needs reading very critically and taking with many grains of salt. H. H.

L'Education Familiale. June, 1911 ; Rue Rubens 44, Brussels. Ten times a year ; 6 fr. per annum.

"La Ligue Nationale," for a great many things, but mainly for teaching mothers how to train their families, fulfils a very useful function in a country like Belgium where elementary education leaves much to be desired. Its committees are mainly composed of countesses and other ladies, with a few ornamental men. Yet three men alone form the executive committee. On the cover appears an engraving representing a mother in process of training her family arranged before her ; with them dutifully stands her husband holding the baby by the hand—but is it essential that he should be made to appear so weak-kneed and dispirited a creature? Perhaps he would not otherwise submit. Its organ, to which attention has already been called, is printed unfortunately on paper of poor quality, but generally contains some good things interspersed with matter of somewhat indifferent quality. One of its best features is its lengthy accounts, with extracts, of current educational books and articles ; an article on the "Defects of Modern Education," translated from the German of Dr. Haller, is quite good. T. G. T.

The Master Word of Sunday School Reform. By JOHN HORNBY, Master of Method and Extension Lecturer to the Ripon Diocesan Sunday School Association. Pp. 95. London : Church of England Sunday School Institute. 1*s.* 6*d.* net.

The Master Word is *adjustment*, and this is the right word. Many flashes of light are thrown upon the work of the Sunday School teacher, and there are numerous wise hints which should lead to deeper study and wider reading. It is written in a very human, sympathetic, and kindly tone, with a distinct literary flavour. Its chief fault is that it is too short ; were it four times as long it would be ten times as useful.

H. H.

The Town Child. By REGINALD A. BRAY, L.C.C. Second Edition, revised. Pp. xi., 255. London : T. Fisher Unwin. 3*s.* 6*d.* net.

This is a thoughtful and powerful book which all studious teachers would be the better for reading. It is, broadly speaking, a book on the effect of environment—the family, the locality, the school, and the world—upon the town child. It should be read with a critical no less than with a receptive attitude of mind. There are, I hold, many false antitheses, *e.g.* between town and country child ; many too easy generalizations ; and some startling psychological and educational misconceptions. It is unworthy of the author to write of "professors of pedagogy, whatever that cacophonous term may signify," and to say that "the sole justification for the present chapter [on "The Child and the School"] must be sought in the fact that its author can boast no professional experience as a teacher." The confession is quite superfluous to those who know the school, and it is much to be regretted that so able a thinker does not possess a real knowledge of school life. H. H.

The Mental Effects of a Child's Environment. By Dr. T. S. CLOUSTON. Pp. 7. London : John Bale, Sons & Danielsson. 6*d.*

A very valuable essay, very clearly and simply written, and as able and learned as all Dr. Clouston's work. H. H.

Experimental Pedagogy and the Psychology of the Child. By Dr. ED. CLAPARÈDE, Professor of Experimental Psychology at the Geneva University. Translated by Mary Louch and Henry Holman. Pp. viii., 332. London : Edward Arnold. 5*s.* net.

The "translators' note" says that they "feel that if they had merely added another good book on child study to those already in existence—which are by no

means too many—they would have had full justification, but in translating a work so simple, comprehensive, and scientific, and by an author with such a great reputation for his work in Experimental Psychology, they are convinced that they have attempted something that was well worth doing. There is, so far as they know, no book which covers the ground in the same way ; and, in their opinion, such a book has long been wanted, and will be eagerly welcomed by those who are concerned to know what child study really means, and how to take part in it. It is a book which should help teachers in the schoolroom and parents in the home." The second edition of the book appeared in Spanish and Russian, and this (the fourth) appears in German, Italian, French, and English. It consists of five sections : Psychology and Pedagogy ; Historical Sketch ; The Problems (of Child Psychology and Experimental Pedagogy) ; Methods (of investigation and interpretation) ; Mental Development (and its relation to Physical Growth) ; Intellectual Fatigue (methods of measuring, etc.).

Publications Received.—*Journal of Education ; Educational Times ; Child Life ; Pedagogical Seminary ; Das Gedächtnis*, by Dr. Max Offner ; *School Hygiene ; The Parent's Review ; A Bunch of Blossoms ; Little Verses for Little Children*, by E. Gordon Browne.

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ADOLESCENT GIRLS FROM THE VIEW-POINT OF THE PHYSICIAN.

By MARY A. D. SCHARLIEB, M.D., M.S.

A Paper read before the Child-Study Conference at Halifax, July 14, 1911.

A consideration of the adolescent girl from the view-point of the physician must necessarily include the following:—(1) The consideration of the characteristics of adolescent girls: (*a*) Physical; (*b*) intellectual; (*c*) moral and spiritual. (2) Adolescent girls considered in relation to their environment: (*a*) The home (father, mother, brothers and sisters); (*b*) the school (teachers and classmates); (*c*) the nation. (3) Management of adolescent girls as regards: (*a*) Food; (*b*) sleep; (*c*) exercise; (*d*) dress.

In considering the physical characteristics of adolescent girls, we must remember that just as they are not the magnified baby, neither are they small women. Adolescence is to be considered as a phase in the development of the human being, a period which is the result of the years that have gone before, and which is itself the promise of the future.

The adolescent girl, as Longfellow says, is standing—

> "Where the brook and river meet,
> Womanhood and childhood fleet."

Much has been written, much has been said, and still more has been thought, about this wonderful period of adolescence both of boys and girls. We are, of course, very far as yet from understanding the enigma, and we probably are in danger of reading more into the page of the girl's life than Nature has written therein. So many of us, physicians, educationists, philanthropists, and philosophers have meditated and

have written on this theme, and so various is the outcome of our researches, that all the things set down, even though it be in all sincerity, cannot be true.

The conception of child nature that was common some fifty or sixty years ago—that it was like a fair sheet of paper on which nothing was written—has given place to the idea that each of us comes into the world with our history virtually written. We are supposed to be so largely products of the past, the good and evil qualities, and the tendency to health and to disease which we have inherited, not only from our parents, but from a long line of ancestors, so dominate our existence that really one would think we had little else to do than to slightly rearrange and transpose the factors of our lives. Admitting, of course, a certain amount of truth in this view, we must make large allowance for the influence of environment and of education, and herein probably lies the hope of the future. We cannot get rid of the inheritance possessed by our adolescent girls, but we can so modify the evil and develop the good by supplying them with wholesome environment, and with education adapted to their needs, as to make their inheritance a blessing rather than a curse. In many instances the intellectual gifts, the moral strength, and the healthy body derived from a long line of intelligent, righteous, and healthy ancestors seems to ask but little at our hands: and even in the less propitious cases careful selection of environment and adaptation of education to individual needs can accomplish much.

It would, however, appear possible that at the present time the children are likely to suffer rather from our fussy attempts to do too much for them than from the apparent neglect of our former methods. There is such a thing as *nimia diligentia*, and it has occasionally been known that a plant has been killed by continual digging it up to see whether it were growing. At present our educational methods suffer from a tendency to continual alterations, and therefore they bring no fruit to perfection.

The physique of the adolescent girl is peculiar in several ways, especially in having but slight stability. Everything is in a condition of flux and change. At this period the growth of her bones is very rapid, even more rapid than the growth of her brother's. Consequently the girl is awkward in gait and in gesture, and seems to have little idea of how to manage her disproportionately long legs and arms. She grows for the time more in height than in width or thickness, and partly in consequence of this, partly in consequence of the immaturity of her muscles, she is very apt to develop the deformity known as scoliosis (lateral curvature of the spine). Her rapid growth predisposes to this

deformity, not only inevitably, but also because the weariness from which she suffers leads her to indulge in various positions which of themselves tend to cause it. Any one who has observed a group of young girls standing, must have noticed how the majority of them stand on one leg, or stand unequally, resting most of the weight of the body on one leg, while the other foot and leg are extended laterally and bear scarcely any of the body weight.

In sitting the posture is equally deleterious, for girls habitually cross one leg over the other, and so cause tilting of the pelvis, deviation of the spine, and protrusion of one or other hip. A third trick is seen when the girl reads or writes, for instead of sitting straight and square to the table, she nearly always slouches, leaning laterally with one elbow only on the table or desk. She also supports her head with one hand while she writes or turns the pages of a book with the other.

These tricks of posture are largely the expression of weariness, but they are also the outcome of imitation. Sturdy and robust girls whose backs are not unduly long, and whose muscular development is adequate, learn them from their more weedy companions. In all cases the result is the same, to a greater extent in tall slender girls, and to a lesser extent in the short and sturdy girls. It is seen in lateral deviation of the spine, rotation of the bodies of the vertebræ and ribs, and asymmetry of the pelvis and bust, due to the unequal incidence of the body weight on the relatively soft bones of which the skeleton is composed.

The body tissues are unstable in proportion to their immaturity, and in proportion to the rapidity of their growth and development, and the effects of this instability are particularly well seen in the girl from about the age of thirteen to the age of eighteen. This includes the period of the most rapid growth and of the most characteristic development. This is the time when the digestive system needs the greatest care, and probably when it meets with its greatest difficulties. The appetite is often capricious and variable, and in addition to the girl's own vagrant fancies, affectionate but unwise relations urge her to eat anything that may please her. During these years the greatest simplicity of food is desirable, and yet it is just the time during which the greatest follies and indiscretions are committed. In many instances girls have attained a certain degree of emancipation, and having escaped the discipline of the nursery before they are fit for self-guidance, they fail to take the simple, wholesome nourishment that their rapid growth requires, and feed themselves upon unsubstantial, though tasty, morsels, from which little nourishment is to be obtained.

Another circumstance inimical to the physical well-being of young girls is the disregard they show to the due performance of their bodily

functions. All through life there is a want of precision and of punctuality in this respect among women, probably owing to the want of precision and order which characterizes the work of the great majority. A thing that may be done any time is often not done at all, and a duty that is postponed until all other calls on time and attention have been satisfied is apt to be entirely neglected.

It has been wisely said that women too often show a disdain of function, and the functions which appear to the young, and to the half-educated to be least worthy of attention, too commonplace and vulgar to be binding on intellectual women, are just those of digesting and of reproduction. This brings us to the next bodily system to be considered. During these momentous four or five years the neutral creature, the child, which was almost indifferently boy or girl, develops in all cases rapidly, in some cases tumultuously, into the highly specialized and complex being known as Woman. The external changes are evident enough—the brilliant complexion, the eye through which the soul now looks for the first time, the glossy and abundant hair, the rounded curve of the bust, the swelling line of hip, and a certain nameless general charm, are only outward signs of the transformation within, a transformation which is accompanied in many instances by storm and stress, and in all by what is a revolution, none the less momentous because it may be silent.

The girl herself fails to understand and to appreciate these changes, it is therefore all the more necessary that those who have the care of her should be quick to perceive, wise to control, and large hearted to appreciate and to assist. Young girls must be taught that even here the divine laws of order, regularity, and normality apply. Formerly, sexual development was considered too private for public discussion, too sacred to be unveiled to those most concerned, that is to the girls themselves. Now we recognize that "Unto the pure all things are pure," and that we cannot do our duty to the ignorant creatures committed to our care unless we ourselves are so instructed that we shall be able to instruct others. It is therefore necessary that doctors, especially women doctors, and educationists, especially schoolmistresses and their assistants, shall have adequate knowledge, and shall be able to talk reverently but clearly and scientifically on these subjects. It is equally essential that those who have the care of adolescent girls, whether they be mothers, doctors, or schoolmistresses, shall be duly fitted and prepared to instruct, to caution, and to help the girls in what is veritably an hour of need, a need all the greater because it is so little understood, and is so very difficult of understanding by the girl in whom the changes are occurring.

The period of instability affects also the nervous system. During early childhood the spinal cord is in many respects the leading member of the nervous system, but in the later years of childhood, and in adolescence the brain asserts its supremacy. The whole nervous system, however, is in a highly unstable condition, and its various functions have not had time to acquire proper co-ordination, hence the extraordinary vagaries, the incoherencies, and inconsistencies of human nature are specially evident in the adolescent girl. Her views on life, and her opinions, religious, political, and social, appear to have as little organic unity as the coloured fragments of glass whose varying combinations delight us in a kaleidoscope. Those adults who have not the key to the enigma think that all these rapid changes betoken moral obliquity, or at least insincerity. This is by no means always the case, and the girl who during adolescence is an ardent suffragette one day, and an exceeding proper Quaker-like body the next, whose politics rapidly vary from old-fashioned Toryism to the rankest Socialism, is by no means the girl who is going to grow up feather-headed and untrustworthy.

With the alterations in structure which accompany adolescence, come certain modifications of intellectual characteristics, *e.g.* there is a distinct, although not great, decline in the wonderful power of memorizing possessed by most normal children. With this decline we notice a very marked development in the capacity for attention, in the power of reasoning, in the rise of taste, the dawn of appreciation of the beautiful, both in art and in nature, and possibly in some small percentage a greater facility for self-expression than is possessed by younger children. It is true that these developing faculties are only in process of making, and have not come to perfection, but it is probably equally true that the undue self-consciousness and sensitiveness of the adolescent girl prevents us from having an accurate knowledge of her intellectual condition. She shares with the savage the instinct of self-defence and concealment, and it would appear that it is only by accident that she allows any adult to peep into the jealously secluded garden of her soul. Indeed, it may be doubted whether much that passes as confidences made by girl to girl are really genuine; it is quite probable that they are of no more value than the froth on the crest of the wave, and that frequently the girl uses speech for what we have been told is its true object—that is to conceal her thoughts.

If the physical and intellectual characteristics of the young girl present contradictions and difficulties, her moral and spiritual characteristics are not less puzzling. Here, also, everything is in a condition of flux and change. The simplicity and unconsciousness of self which characterized healthy childhood give place to a very poignant

self-consciousness. Although the girl has not found herself, she has at any rate become aware of her own personality, and the result for the time being is trying to her and to those who have to deal with her. As far as one can judge, she is a mass of vague perceptions, of ambitions, and, alas! of vanities. She is not "drunk with wine wherein is excess," but she appears to be giddy and confused by the vision of life with all its possibilities now dimly seen by her for the first time. New thoughts, new feelings, new wants, and new desires crowd upon her. She begins to feel with the Irishman, who said that "One man is as good as another, yes, and much better, too." The young girl is probably one of the most difficult machines to understand and to manage. As one said to me, she is "furiously fond of liberty," and is apt to resent all restraint, and even guidance. It, no doubt, appears to her that no one ever was exactly like her, and that, therefore, no one can really understand, sympathize, and help. Although her mother must have been a young girl some time, she could never have been just such a young girl, and, even if she had been, during the long years that have elapsed—let us say between fifteen and thirty-five, she thinks that the waters of Lethe must have obliterated the mother's memory of her own girlhood. No doubt, to some extent, the girl is right, for, unfortunately, as life goes on, the girl forgets the experiences of the child, the young woman those of the girl, while the old generally show only too little remembrance of, and sympathy with, their former selves.

The young girl during this transition period is very difficult to deal with, and is sometimes very provoking. This is the time for all sorts of enthusiasms and follies, for unwise and absorbing friendships, for that sort of pseudo love between girls which can never lead to anything, and which being unnatural is necessarily unblessed. These wild and absorbing passions for schoolmates or school teachers luckily are seldom of long duration, and the bosom friend of to-day is after a few months not unfrequently either an object of mere toleration or even of dislike.

Probably these absorbing friendships, which are much to be deprecated, may be due to the incipient developments of sexual feelings. They ought to be discouraged because they are unwholesome in themselves, and also tend to take the first bloom and freshness off the love which should naturally be reserved for some member of the opposite sex.

Another trouble with which parents and teachers have to contend is the tendency of the adolescent girl to make mysteries and secrets out of the veriest trifles. Not unfrequently a certain number of girls in a school or college band themselves into a sort of guild or secret society,

more or less well organized, with pass-words, rites and ceremonies, which are all the more delightful to the members because they are supposed to be outside the purview of the powers that be and are also not to be shared in by any but the inner brotherhood. Closely allied to this is the manner in which the fashions and crazes set by one or two girls of a little community run through it like wildfire, and yet must not be adopted by younger girls or by those out of favour with the leaders.

With regard to the religious position of the adolescent girl, some people of great experience, among them Stanley Hall, think that she is frankly irreligious, and unless she chances to have acquired a sickly sentimental devotion to some very earthly representative of the Deity, she is, they say, a mere pagan. This view is not generally true. It is more probable that the girl's religion partakes of the general incoherence and instability which dominate her whole being for the time, but in the case of girls who have been properly trained, whatever the surface vagaries and mutations may be, there is a deep undercurrent not only of religious feeling but of religious sense. The adolescent girl herself has many troubles to contend with, and her friends have even more, but things would be worse than they now are if the majority of girls did not possess a good fundamental religion, a principle which guides them like the magnet guides the mariner, who, although he may steer an erratic course and appear to be at the mercy of the winds and the currents, still keeps his eye fixed on the north, and when the storm and the stress are over will be found to be not much out of his appointed course.

(*a*) *The Home*.—The influence of the home on the formation of character and on the physical condition of children is almost unlimited, and those who maliciously or carelessly loosen the sacred bonds of home and weaken the natural ties that bind the family together are doing an irreparable harm to the nation. In the ideal home the parents are good, wise and loving, the children are dutiful, loving and obedient. In an ideal home, no matter how poor, each member sets the happiness of the others first, and each member endeavours to promote the common welfare.

One of the primary conditions on which home welfare depends is unity of aim and joint endeavour on the part of the parents. The old Latin maxim says: "Miserable is the condition of that State where the law is lax or uncertain," and miserable indeed is the condition of the home where the parents fail to rule, or where each rules in his or her own way without adapting that way to the rule of the partner. "If the trumpet gave an uncertain sound who shall prepare himself for

battle?" and if parental orders are conflicting, confused and uncertain, how can the children render obedience? And yet it is on their obedience and on the mutual love of parents and children that family welfare depends. We are told that the influence and happiness of the home has steadily declined during the last fifty years, and unfortunately there is a good deal of truth in this assertion. The old-fashioned principle of prompt obedience and submission to the will of the parents has in too many instances disappeared, and the children, like the Israelites of old, do "that which is right in their own eyes;" even the outward forms of respect are wanting, and the children have ceased to order themselves lowly and reverently to their betters. We live in a democratic age, and the uneducated children, like the uneducated masses, are accorded a freedom and an initiative that would have been judged intolerable fifty years ago. We cannot set the clock back, possibly it would not be well to do so, but rule there must be, and if the children are to be to a large extent the judges of their own actions, if they are to be released early from outside control, it is all the more necessary that they should be taught from infancy the principles of self-government. The highest religious and moral principles, those of truth, of justice, of self-abnegation, and of love, should be the atmosphere that surrounds them, and instead of a want of respect for their elders, and for themselves, we should do our utmost to secure self-knowledge, self-reverence, and self-control, the sturdy stock from whence will spring the flower of filial duty and respect. This end must be attained, and we must see to it that if old methods have fallen into disuse the new method shall be no less efficient.

The adolescent girl is perhaps more deeply affected by the laxity of the present régime than any other member of the family. What poor little vestiges of parental control still exist, exist not for her. In many instances she has acquired that little knowledge which is so dangerous a possession, and frankly despises a father and mother whose opportunities of book-learning have not equalled hers. One remembers well the harshness of judgment and the impatience of perfection that characterized our own childhood. It was wisely said that "the young hate evil far more than they love good," their ideas are cut with crystal clearness, and anything that fails to square with those ideas is not only held to be mistaken, but absolutely wrong.

There is a very real danger lest in inculcating the highest ethical and spiritual truths and holding up a standard of perfection we should show the young, especially the young girls, how very far their older friends fall short of the ideal. The remedy for this trouble is to constantly point out to our pupils how in many things we all offend, and to let

them see quite clearly how very far their own performances fall short of their ideals and ours. Knowledge and even righteousness will avail them little unless they be informed and transfused with humility and love.

It is upon these conditions that a healthy and happy home may be secured, a home where every member, father, mother, brothers and sisters shall, so far as in them lies, live for the others and not for themselves.

(*To be continued.*)

CO-EDUCATION DURING ADOLESCENCE.

By BERESFORD KINGSFORD, M.D., D.P.H.

A Paper read before The Child Study Society, October 19, 1911.

Before opening a discussion on the subject of my paper, it may be as well to define the meaning of the terms used in the title. By co-education I mean the education together of the sexes; by adolescence, the period from the age of fourteen to that of about eighteen and a half, being the four or five years spent at Secondary or High Schools. In the most general sense few of us altogether escape co-education, for, seeing that we live in a mixed society, all who are educable at all must learn something from, or in the presence of, the opposite sex. In the more scholastic sense co-education varies in degree from mere co-attendance at lectures to the full sharing by the sexes of classes and class-rooms, and of games and playgrounds, such as may be seen at Keswick and other boarding-schools where the differences between the sexes are in practice reduced to a minimum. So the question before us may be stated thus—should co-education be carried on during adolescence at all? and if so, with what limitations, if any?

When any change is proposed, we have first to ask what are the advantages to be gained by making that change? The advantages claimed for co-education are: that it is economical, and so brings secondary education within the reach of more young people, especially of girls; that it makes the maintenance of discipline easy, thereby economizing the powers of the teachers; that it fosters a spirit of comradeship and a mutual understanding which lessens sex tension and is better than either mutual contempt or idolization; that it exercises a refining influence on the boys, making them gentler in manner and more healthy minded, while it stimulates them to work more conscientiously, and teaches them something of the spirit of self-sacrifice;

and that it exercises a tonic influence on girls, improving their physique and widening their outlook on life, while it makes them less shy and unstable, and raises their standard of courage and straightforwardness.

It is admitted, however, that these advantages are only to be had at a price. To make co-education a success: first, the teachers must have plenty of enthusiasm for thorough-going co-education; and there must be approximately equal numbers of both sexes at all ages. Next, the teachers must manifest trust in the young people's honour and yet exercise a ceaseless though unobtrusive vigilance over their conduct; they must also attend carefully to administrative detail in the matter of cloakrooms and lavatory approaches. Moreover, a full mixed staff of teachers, decently paid, is essential; and the system is more likely to prove a success if begun in pre-adolescent days. Economy must be allowed to count for something in favour of co-education, if only this, that better salaries could be and should be paid to the teachers; to the men, to attract more of them from other parts of the industrial market; to the women, that they may feel less the position of inferiority that the receipt of smaller salaries implies. In America the contrast between palatial equipment and beggarly salaries is sometimes very striking.

That co-education makes discipline easy is much in its favour, especially where under woman's régime the rod has been banished and devoted teachers wear themselves out in "coaxing, rewarding, or coquetting with parents to keep boys decent, when a single dose of Dr. Spankster's tonic would do the business with celerity and dispatch." * With regard to the other advantages claimed for co-education one feels the need for "control" experiments.

The weight of opinion set forth in the works of the leading co-educationists appears to be very great. On turning to the report of the Moseley Commission, we find some difference of opinion as to the improvement of character effected by co-education. The Rev. Branston Gray says, "Co-education is largely corrective of the tinge of effeminacy which the preponderance of the woman teacher is unhappily producing in the highest classes of American secondary schools . . . the girl was regarded . . . by the boys as a class-mate . . . nothing more." † Professor Rhys tells us of a leading headmaster who assured him with no little satisfaction that in the whole of his school no youth ever looks at a girl because she is a girl, and adds, "I had not the courage to ask him if he really thought that quite desirable." Professor Armstrong remarks, "The boy in America is not being brought up to punch another boy's head, or to stand having his own punched, in a healthy and proper

* Stanley Hall, "Educat. Problems," ii. p. 583.

† "Moseley Report," p. 167.

manner." These contrasts, which are, I think, fairly representative, tend to show that the boy is being pretty successfully tamed, but whether by the women teachers or the girl class-mates is not obvious. Hugo Munsterberg,* of Harvard, points out that the popular statements that co-education strengthens the girls and softens the boys, *or*, feminizes the boys and takes the charm from the girls, lead us no farther; and adds, "it needs an experimental inquiry to find out the differences in the various mental activities with and without the presence of the other sex. "Co-education," he says, "may, with certain groups, have the effect of . . . making the sexes indifferent for each other, and in other groups it may have the opposite effect. . . ." Thus Stanley Hall † tells us that in Miss Crum's investigation one-fourth of the girls interviewed said they had heard girls and boys of thirteen conversing on sex subjects—immoral acts are reported in sixteen cases—and eleven of these eighteen to twenty-year-old girls are very emphatic in the opinion that the sexes should be separated in the upper grammar grades, most of them holding that conditions here are worse than in the High School. "Those who know these facts," says Stanley Hall,‡ "have one argument against co-education for budding boys and girls which those who maintain the old attitude of incredulity or wholesale denial, know not of. Many teachers who have run with success the machinery of our public city schools have never seen these things, so clandestine are they and so invisible to those who look only upon the surface."

On turning from this controversy to the Moseley Report, one is much struck by the favourable impression which the American system of co-education made on the minds of many of the Commissioners, except as regards the predominance of women teachers in the High Schools, especially in those of the Western States, which at least two of the Commissioners attribute to their mixed classes. But the Report probably gives too favourable an idea of American education and its effects. For instance, one author draws a delightful picture of the fraternal relations subsisting between employers and their employees. Those who have read such books as the "Lords of Industry" and the "Standard Oil Trust" may be pardoned for believing that the aforesaid relations are often more fratricidal than fraternal. And Stanley Hall says, ". . . our system often looks to properly credentialed inspectors from abroad better than it is." ‡

Now as to the requisites for success in co-educating the young. Unless the teachers have plenty of enthusiasm any system of education

* Munsterberg's "Education," p. 306.
† Hall, "Ed. Prob.," ii. pp. 25–31.
‡ Ibid. 571.

is likely to fail, but this is especially true of co-education, because the process is in some respects more complicated and difficult. As long as any movement is in the struggling stage it is comparatively easy to get up enthusiasm for it, but as opposition dies away enthusiasm dies too. It may not prove easy to keep up the teachers' enthusiasm for an accepted method to such a pitch that they will always attract an approximately equal number of scholars of both sexes. When the numbers of boys and girls become very unequal, as in U.S.A., the interests of the minority are pretty sure to be sacrificed to those of the majority more or less. Enthusiasm is needed also for the exercise of that ceaseless though unobtrusive vigilance, and that extra attention to cloak-room detail which all admit to be necessary in co-educational schools. It is wanted no less to promote the hearty co-operation of men and women on the same staff, as there can be only one captain to the ship; however able and zealous the commander of the opposite sex may be.

Next, we have to consider the advantages and disadvantages of co-education from the point of view of physiological and intellectual development. There seems little doubt that in the early years of school life the superior industry of girls supplies a much needed stimulus to boys. For two or three years the girl outstrips the boy in physical growth, and generally in intellectual development also. There soon comes a time when the development of the girl into the young woman has to be reckoned with. For about two years any corresponding development of the boy is insignificant, and so boys begin to catch up the girls in work. When and where, as in some London County Council schools, there is anything like direct competition between the sexes the progress of the boys acts as a spur to the girls just when their energies need conserving for physiological purposes.

Moreover, the mere presence of boy class-mates may have an injurious effect on a girl. Before other girls she can slack a bit from time to time without exciting any attention. Before the boys, however, whether in work or play, she feels that, cost what the effort may, she must give no sign. And thus co-education may initiate and foster neglect of bodily function which women are all too apt to treat with disdain.* When medical officer to a large house of business I found some exemption papers to sign almost every morning, clear evidence of the *need* felt by many young women for periodical slacking. Dr. Blacker says, "In many of the High Schools for girls there is unfortunately a tendency upon the part of principals to . . . regard the 'periods' in the light of an evil, which must not in any circumstances be allowed to

* Mrs. Scharlieb, Cd. Study Congress, Halifax.

interfere with their pupils' course of studies." * Professor Dewey found that in female colleges 55 per cent. reported abstinence from study or exercises during these times, and in co-educational colleges 25 per cent.†—but one-third more of the students break down from emotional strain in female, than in co-educational, colleges.

Then we have to reckon with differences of mental power, or rather attitude. For as to mental power, I once asked Dr. Mercier how the ladies of the "Royal Free" compared with the men of Westminster Hospital. He replied, "Oh, they are much like the men! a few bright sparks, a mass of mediocrity, and a residuum of dunces, much like the men." As to the difference of attitude Professor Warrington thought "boys welcome a problem to solve by their own efforts . . . girls welcome instruction."‡ And Professor Welton says, "If men value general principles more, the concrete whole appeals to women more, and in individual cases women often arrive at substantial justice rather than men."§ Welton thinks that a mixed staff will meet this difficulty better than co-education. Professor Gregory Foster says that several of the most able teachers in U.S.A. "were inclined to take the view that the presence of the girls tended to make the general tone of the work of the class less strenuous than it would have been had there been only boys therein," but that he met with nothing to confirm that impression.

If "progress is difference," ought we not to use the differences we find for the advancement of our nation rather than to minimize and obliterate them in quest of that will-o'-the-wisp "equality of opportunity" for the individual? Male and female apes differ less *inter se* than savage men and women, and these less than civilized men and women, and *their* occupations differ more and more with the progress of family life.‖ If education is a preparation for complete living, *some* co-education must be the more complete preparation for those who have to live together later on. But if the sexes are not going to work side by side everywhere and always, and if their work must be largely different, the preparation for it, both in school and out, must be largely different also, and this greatly limits the amount of co-education which is either feasible or advisable during adolescence. "Emancipation and the higher education of women," says Hall, "must now progress along lines of differentiation, and education must recognize this and evolve its curricula to fit the diversity of nature and needs."¶

* *Practitioner*, Oct., 1911, p. 443.
† S. Hall, "Adolescence," ii. p. 584.
‡ A. Woods, "Co-education," p. 116.
§ "Psychol. Educat.," p. 129.
‖ S. Hall, "Ed. Prob.," ii. pp. 586 *seq.* ¶ Ibid. p. 593.

Lastly, we have to deal with the political aspect of co-education. I speak not of party politics, but of the bearing of co-education on the supreme interest of nationality. Just as Cobdenites are entitled to advocate Free Trade on cosmopolitan, rather than national, grounds, provided they make clear their position, so are co-educationists entitled to advocate their system with a view to obtaining thereby political privileges or rights for women rather than on strictly educational grounds, *provided* they clearly avow their motives and do not covertly make use of an educational system as a stalking horse for political power. Some co-educationists have shown their hands pretty plainly. Dr. Jane Walker says,* "The far larger and more wide-reaching woman question is involved in this question of co-education." † And Mr. Badley, writing of the movement in favour of equal opportunity of all kinds for women, says, "It began as a demand for higher education . . . then followed a demand for careers . . . now has come the demand for political equality. In a common education . . . largely shared together we recognize one of the most powerful means of promoting this sense of underlying unity and the comradeship in the pursuit of a common aim that we begin to feel to be one of the chief needs of our time."

When I asked Doctress Thorndaite Smith, of U.S.A., whether boys stand to gain as much from co-education as girls, she said, "Now you have asked me a very hard question—the fact is that elder boys need men to teach them."

Since the community exists for woman and not woman for the community, she rightly claims to dispose of her powers either in the industrial or in the marriage market or even in both. Will co-education incline her preference towards the industrial market, and if so will *that* be prejudicial to the supreme interest of nationality? Direct inter-sex competition in High Schools will suggest to young people that their business in life is competition rather than the exercise of complementary functions. Can average teachers get the best work out of their pupils without emulation, and its first cousin, pugnacity? It is doubtful whether co-education, at all events as worked in America, cultivates pugnacity sufficiently. For rightly directed pugnacity is, as Dr. MacDougall has pointed out, "one of the essential factors of the higher forms of social organization." ‡

The question comes to this, will co-education help men and women to make the needful sacrifices for the state? Great Britain no longer enjoys that supremacy in maritime trade and war that she gained in the nineteenth century, and the preservation of our nationality will call for

* *Forum*, July, p. 94. † "Co-education," p. 4.
‡ "Soc. Psychol.," p. 281.

greater sacrifices in the twentieth century than those required for three generations. Will co-education fill the ranks of Boy Scouts and Territorials or of Girl Guides and Home Makers? The family is not a product of design, but the form of human association which has beaten all its rivals and proved its survival value. Mere intellectual achievement will never save a nation without moral attainment, for intellect alone has an anti-social tendency.

Is there any statistical evidence to show that marriages between co-educated scholars are more frequent or happier than those among other young people in business together? The more educated portion of the American people certainly, the population as a whole (apart from immigration) probably, fails to reproduce itself. College women in U.S.A. marry comparatively seldom or late in life, but those from co-educational colleges marry more frequently than those from female colleges (as 32 : 25).* Those who believe that children are not all equally educable will regret any form of education which leaves the most educable women disinclined to pass on to another generation their superior educability. To raise the standard of woman's preference in marriage is a great good unquestionably, but *may* be dearly bought at the expense of future generations in an empire like ours, which so badly needs families to people up its waste spaces. Making all allowance for differences of divorce laws in different states and countries, it still seems unlikely that co-education has any substantial influence in promoting happy marriages, since divorce is most common in the most thoroughly co-educated parts of America. Nevertheless, America has done a wonderful work in peopling up a vast continent—with, or in spite of, her educational system—and her teachers have shown an extraordinary power of assimilating millions of aliens, for America Americanizes all her children.

If we follow the lead of America in adopting co-education, let us at all events avoid her mistake of letting that education pass too much into the hands of one sex, whereby boys are driven too soon to business, leaving the girls to get most of the culture, and with it some disdain for their less cultured brethren.

* S. Hall, "Adolesc.," ii. p. 591.

THE PHILOSOPHY OF BOYS' GAMES.

By FELIX CLAY, B.A.

(*Continued from p.* 108.)

So far as we have assumed that the growth of the individual child in its progress towards the adult stage resumes, with omissions and short cuts perhaps, but broadly and generally, the history of the race—known shortly as the recapitulation theory. There is, on the other hand, the well-known theory of play originated and worked out with great elaboration by Groos in his "Play of Animals," and subsequently applied to human beings in his "Play of Men," by which it is maintained that play is simply practice for the future, the animal does not play because it is young, but it has a period of youth in order that it may in play exercise its muscles and body and learn to co-ordinate the movements that it will subsequently require for life in real earnest. Undeniably play does exercise the muscular system, and any exercises are bound to follow in their lines those for which the particular muscles have been developed, but although Gross carries this theory to such extreme lengths as to make it explanatory of all play and games, it does not, when carefully examined, appear to account for much more than the simple forms of exercise, and fails to give any satisfactory suggestion of the deep pleasure lasting as long as life, not merely in youth—which forms of play, sport and games are found to give. I should like to read you a short extract from Stanley Hall's "Youth" upon this theory :—

"The view of Groos that play is practice for future adult activities is very partial, superficial, and perverse. It ignores the past where lie the keys to all play activities. True play never practises what is actually new to the race, and this, industrial life often calls for. It exercises many atavistic and rudimentary functions, a number of which will abort before maturity, but which live themselves out in play like the tadpole's tail, that must be both developed and used as a stimulus to the growth of legs which will otherwise never mature. In place of this mistaken and misleading view, I regard play as the motor habits and spirit of the past of the race, persisting in the present, as rudimentary functions sometimes of and always akin to rudimentary organs. The best index and guide to the stated activities of adults in past ages is found in the instinctive, untaught and non-imitative plays of children which are the most spontaneous and exact expressions of their motor

needs. Thus we rehearse the activities of our ancestors, back we know not how far, and repeat their lifework in summative and adumbrated ways. It is reminiscent, albeit unconsciously, of our line of descent; and each is the key to the other. The psycho-motive impulses that prompt it are the forms in which our forebears have transmitted to us their habitual activities. Thus stage by stage we re-enact their lives. Now the elements and combinations oldest in the muscle history of the race are re-represented earliest in the individual, and those later follow in order. This is why the heart of youth goes out into play as into nothing else, as if in it man remembered a lost paradise. This is why, unlike gymnastics, play has as much soul as body, and also why it so makes for unity of body and soul. Thus understood, play is the ideal type of exercise for the young, most favourable for growth, and most self-regulating in both kind and amount."

Nor, indeed, is it sufficient to regard play as simply as an overflow of animal spirits, an outlet of excessive energy directed—as Herbert Spencer suggested—in the form it takes by the tendency to imitation. Not only is play pursued far beyond the point of fatigue, but its more alluring forms are always able to rouse the tired and even unfit to indulge in it. Nor does this help to account for the enormously important psychical factor in games. Up to a certain point, it accounts for the simple forms of movement play. The natural functioning of any organ or muscle when in a suitable condition is in itself pleasurable—and as proper growth and development depends on use we may well believe in an instinctive desire for movement and exercise—prevention of this may reach a high degree of discomfort, especially in the young. The limbs call out for movement. "My legs feel like running," said a boy. There is a joy in mere exercise and rapid movement which can rise to a height that is almost intoxicating, giving a sense of well-being and pleasure of a very enjoyable kind. But whatever allowance we make for this, we are still a long way from explaining the fervour and enthusiasm that can be evoked by games, especially those that require the co-operation of a team.

We can trace all our pleasures back to the satisfaction of a need that has at some time been an imperative one in the history of the race or the individual—every emotion is the feeling side of an instinct gratified, or, as *e.g.* in the case of anger, thwarted. Roughly speaking we find the pleasure proportional to the importance at early times of the activity to the individual or the race. Success in hunting, warfare, in holding one's own, and preserving the tribe was an absolutely vital need, and leaves ineradicable trace, not only in the enjoyment of sport, but in the pleasure of successful effort of any kind, as in satisfying the

ambitious feelings, or again in a self-sacrifice believed to be advantageous to one's country, or in a wider sense to humanity.

We may well believe that in all the various methods of developing our growing and muscular powers the race development comes near the individual, and that there is the old ancestral momentum behind. In many we can trace no meaning, they are mixed up, some have altogether disappeared, some leave almost rudimentary traces, short cuts are frequent, and as yet we have not the key to many, especially the earlier ones. But later they become more intelligible, and we can form good guesses at their significance. So we see pursuits that once were toil, work, the aim, and object in life, whose successful achievement meant survival, now leave their traces in simple delight.

Skill in throwing with accuracy, speed in running, dexterity in hunting and fishing are no longer necessary or even valuable in ordinary life, but our body and our mind have been developed on lines to secure success in these things; thus it is that a full development of mind and body involves the use of our growing muscles and intellect—not necessarily upon these same things, but upon some form of activity that will be sufficiently near to ensure the due growth of the individual. As the race has passed through these stages, so should the individual, and leave behind in his turn as he grows, what the race has previously left behind in its advance. We have reached our present stage through these, the mind of the child has not yet arrived at our stage as adults—feelings and processes of reasoning so natural to us that we do not notice them have not yet started in the boy; it is useless to expect him to be affected by everything that appeals to us, he is passing rapidly through phases. We may be alarmed and horrified by what seems a relapse into savagery; or at his utter absorption in sport or games. We need not, however, despair, he is merely in a stage through which the race has come and will emerge, if wisely treated, leave it all behind and for the future be immune; the desire has gone, and his newly awakening instincts, if wisely dealt with, will set him on other and quite different paths. If balked of legitimate outlet no one knows in what undesirable directions they may break out.

The best exercises for the young are those directed to develop the basal or fundamental powers, the old racial movements rather than those peculiar to the individual—it should lay stress on those psycho-neural and muscular forms which race habit has handed down rather than place too much reliance upon exercises designed to develop our ideas of symmetry, etc. Gymnastics and exercises, however ingeniously thought out, can never replace games, and free exercises such as nature impels.

The best guide will thus be instinct and spontaneity. Hereditary impulses really determine the order in which nerve centres come into function. Those oldest in the history of the race come first, those that are higher and represent volition come later. For example, speech uses most of the same organs as does eating, but the former are controlled from a higher level of nerve cells. Right and efficient mastication thus helps to develop the organs of speech. In all parts of the body and mind the higher is built on and developed out of the lower, and so the necessity of proper development of what are, in comparison with civilization, not only lower but often inconvenient and unnecessary activities. The principle has won its way pretty well into education, and great skill is shown in adapting the work to the developing faculties, in not going too fast, in providing scope in suitable channels for the child's awakening instincts. Play is also managed in this way for the quite young children, but I doubt whether the principle has been properly, or at all, applied to boys' games. Of recent years games have begun to demand an extraordinary degree of attention at school; they are made compulsory in many cases, and stimulated in every possible way. They provide so useful and valuable antidote to many difficulties and evils of school life that there is nothing to be wondered at in this, but there is great danger that the balance of advantage is swinging over. All the small boys at the preparatory schools are expected to play with the same enthusiasm as their elders the public school games; they are egged on, and forced on, until the fact that games and play ought to represent freedom and more or less untrammelled spontaneity as to choice, etc., is forgotten. Games that are the best for boys of thirteen or fourteen to eighteen or adult age are probably not the best for little boys of eight and nine to eleven or twelve. The preparatory school with its cricket coach and its rigidly correct standard of play is an anomaly, and I am sure in many cases it would be much better to have a freer choice of game. Speaking from memory, what I really enjoyed at my private school were the walks, or rather runs, when we played at soldiers and scouting, a kind of hide-and-seek on the grand scale. I cared little then for cricket and football, by which later on I was fascinated. Rousseau, as is well known, advocated leaving the child to nature and primal hereditary impulses, letting him run wild as a savage until the age of twelve. Impossible as this is under the conditions of modern life, there is a lot to be said for it, and as Stanley Hall points out in his book on "Youth," there are many and cogent means for it if only a proper environment could be provided, and goes on to discuss the point in an interesting passage:—

"The child revels in savagery, and if its tribal predatory, hunting, fishing, fighting, roving, idle, playing proclivities could be indulged in the country and under conditions that now, alas! seem hopelessly ideal, they could conceivably be so organized and directed as to be far more truly humanistic and liberal than all that the best modern school can provide. Rudimentary organs of the soul, now suppressed, perverted, or delayed, to crop out in menacing forms later, would be developed in their season so that we should be immune to them in maturer years.

"These inborn and more or less savage instincts *can* and *should be* allowed some scope. The deep and strong cravings in the individual for those primitive experiences and occupations in which his ancestors became skilful through the pressure of necessity should not be ignored, but can and should be, at least partially, satisfied in a vicarious way, by tales from literature, history, and tradition which presents the crude and primitive virtues of the heroes of the world's childhood. In this way, aided by his vivid visual imagination, the child may enter upon his heritage from the past, live out each stage of life to its fullest, and realize in himself all its manifold tendencies. Echoes only of the vaster, richer life of the remote past of the race they must remain, but just these are the murmurings of the only muse that can save from the omnipresent dangers of precocity. Thus we not only rescue from the dangers of loss, but utilize for further psychic growth the results of the higher heredity, which are the most precious and potential things on earth. So, too, in our urbanized hothouse life, that tends to ripen everything before its time, we must teach nature, although the very phrase is ominous. But we must not, in so doing, wean still more from, but perpetually incite to visit, field, forest, hill, shore, the water, flowers, animals, the true homes of childhood in this wild, undomesticated stage from which modern conditions have kidnapped and transported him. Books and reading are distasteful, for the very soul and body cry out for a more active, objective life, and to know nature and man at first hand. These two staples, stories and nature, by these informal methods of the home and the environment, constitute fundamental education."

This, then, is the main point that I wish to make in my paper—the need of providing due opportunities and facilities for the, so to speak, working out of these passing phases not only as an essential part of full growth, but as valuable preventive of too early precocious development, bearing in mind that as the race advances in civilization and progress it has dropped certain of the low as it reaches the higher, so in turn will the individual drop them in due course.

In many boys the instinctive needs are so imperative that they will gratify them at all costs. Such boys are the leaders in devising games

which do provide a suitable field; but in many cases they require opportunity or even forcing, to get their chances of development. This brings one to an aspect of games and school life that has not, I think, always secured sufficient attention. We deplore the artificial nature of the life of a school, and the whole system of our public schools has been subjected to scathing criticism, but although the objections to each point taken in detail are unanswerable and crushing, yet the undeniably fine results of public school life still ensure its hold upon public opinion and the continuance of the school. I venture to think that this is due to a large extent to the points we are considering. It is not so much the artificiality of *school life* as that of our whole existence, compared with the conditions of the immensely long period during which the race has developed. The vast majority of people live in dense centres of population, in absolute security as to food, housing, clothing, or attacks from other people or animals, their environment is wholly artificial and as unlike that of primitive man as can be imagined; what may be termed natural laws are interfered with and suspended. At the same time our physical conformation, instincts, etc., were developed to meet the other sort of conditions. We cannot expect the individual, as he passes through the succession of developing instincts, to be able with impunity simply to crush them, but they can be diverted, and satisfaction obtained and due growth secured by some kind of colourable imitation of the natural conditions.

Now, a large school presents in many ways a curiously close parallel to what we may imagine primitive life to have been. There is to an unpleasantly marked degree the struggle for existence between the units; each has to fight for his own hand—almost for his existence: if he does not get a thing for himself, no one will get it for him. This produces that frequently striking selfishness and egotism of the schoolboy; questions at issue are usually settled by physical prowess, controlled by certain well-defined, if highly arbitrary, customs, that have the full face of established law; verbal intercourse is free and direct to a degree difficult to realize by those who have not experienced it. Individual quarrels are frequent, but instantly put on one side to meet a common foe. There is the same tendency to repress any sign of emotion, and from the lack of sympathetic imagination the cruelty and callous disregard for the weak and unfit, which, in spite of notable exceptions, emerges so unpleasantly at times; the same handing down of customs and habits which are rigorously enforced long after they have become utterly meaningless; with the reverence for existing practice which amounts to fanaticism.

There is, unfortunately, the inevitable tendency, which is so strongly

marked a feature of savage life, to produce a type, to level off peculiarities and bring every individual to the usual standard. There is some levelling up, but inevitably more levelling down, required to get to the average.

The qualities that bring a boy to the front are the primitive virtues of courage, strength, and personal skill and prowess, which form the finest possible basis for the future development of the higher qualities. In the feuds that sometimes arise between houses, and even in the house matches themselves, we have a kind of echo of the continuous inter-tribal fighting.

There is no doubt that, with all its faults, the public school, with its games and life, provide, for the boy brought up in a comfortable well-to-do home, in a way in which nothing else has yet been devised to do, an environment in which he can live out to the full certain phases of his developing powers.

This, again, throws a light upon the almost incredible quickness with which a home-bred boy will drop into school life, and find himself happy and at home in an environment that is startlingly different to anything he has previously known. The experience and conditions are new to him as an individual, but he has inherited aptitudes and instincts that are simply waiting for their opportunity. I think, also, the same considerations account for the lack of objection felt by small children, and especially boys, to the most bloodthirsty and appalling stories and pictures, which often appear revolting to the adult mind, with his developed social and sympathetic imagination.

The problem of school is how best to turn these tendencies in the right direction while still providing full scope for their development. It is here that games are pre-eminently valuable. In games the primitive instinctive impulse has to be controlled and disciplined, and to a large extent it is so by the development of the succeeding higher and later developed instincts. The feeling for law and order which brings a race or nation to the front finds its counterpart in the game, which fails as it becomes lawless, and is most successful when the rules (formed by custom) are most rigidly enforced. I need not labour the point; at every turn we see how games form a steady and sure process for guiding, controlling, and turning into innocent directions those headstrong instincts—but also does the whole school life. If the boy has never played games, never mixed in the rough and tumble of life, never had any opportunity of a real recognition of how discipline and self-subordination are essential to concerted action, he is at a disadvantage in later life. He has not found his level; he is likely to be undeveloped, conceited and over-confident, or unnecessarily retiring and diffident; he rebels against the authority of

others, and is unable or unsuitable to wield it himself. Please do not think that I am trying to show that school and school games are the only means of good training, but I want to emphasize the point that we cannot and must not overlook the fact that there are these strong tendencies that have to be provided for, that they cannot be safely disregarded, and that they cannot be obliterated by simply ensuring that there should be in the boy's life no opportunity for their exercise. The safest and only way to deal with them is to ensure that they are safely and wisely worked off, *and at* the right time; in this way not only will they do no harm, but, like all the other curious phases of boyhood, pass away, only leaving their trace in a better developed basis upon which to build. If suppressed, they will inevitably crop out later in all sorts of undesirable forms.

The part that games play for a period in the life of many boys is difficult for any one to realize who has not experienced it, for boys are reserved and do not readily express their feelings. Far beyond the mere exercise, and the joy in the skill exercised and in beating an opponent, games fill many a boy's horizon, and all his waking thoughts, books that he reads of battles and heroes, the stories that he hears, all become merged in a kind of glorious haze, the spirit of which he somehow works within his games.

This does not of course apply to all boys, but most get a touch of it at some time or other.

At the same time, however much we recognize and value the possibilities of school life and games for good, there is much that we must deplore. The pugnacious instinct, the pleasure in personal conflict, in fighting, receives an undesirable amount of encouragement. The animal world is full of it, and primitive warfare is a matter of personal combat, a hand-to-hand fight where victory means survival. In its more brutal form we see human nature at its lowest. In an American magazine (*Ped. Sem.*) in an interesting article on teasing or bullying, the writer shows how the lower instincts crop out irresistibly in boyhood, when fights are often engaged in with an almost desperate freedom and a real intent to inflict serious personal injury. As a rule these instincts are repressed before sufficient strength and skill are developed to do serious bodily harm, but if not directed aright they lead directly to the criminal. The ability to get angry and even if necessary to fight, is for a boy distinctly a good part of his moral education, and non-resistance under all conditions may be to a high degree unmanly and cowardly, and generally speaking it is only at school where the conditions are primitive that the fighting will take a physical form; but whatever may be said, the boy who during his school period is ready to

stand up and fight for his principles or himself, is the one who is likely in after life to be equally strong morally; the parallel between physical and moral courage is of course a very close one. This is not in the smallest degree to suggest encouragement of the quarrelsome boy, but to point out that a sentimental shrinking from all kinds of fighting by a boy is by no means likely to produce a satisfactory result.

It is, then, in school life, and principally in the games, that the boy finds his freest opportunity of living out his old racial instincts, of developing in this way his body and his soul to form a solid foundation upon which subsequently to build. But at the same time the more clearly we recognize the value or rather the necessity for these games and school period for boys, the more clearly we should realize that it is a passing phase, that it represents a period in the race history through which civilization is reached, and thus through which the individual will generally pass. For a boy to regard games and sports—hunting, fishing, shooting—as the only important things in life, is very natural, and for a time harmless, but our education has failed if he continues to do so as an adult. With the awakening of the later instincts, and the development of the higher levels of thought, games and sport should *pari passu* fall into their proper place as a relaxation, or amusement, pleasant but of little importance. Unfortunately, the present tendency of the school attitude to games does little to bring this about, and many boys leave school firmly imbued with the idea that games and sport are the only things that matter, with work as a disagreeable necessity to be got through, and only redeemed by the fact that it may provide funds to indulge in the former.

Until comparatively recent times, games were played by boys at school, or otherwise, rather against than with the goodwill of the authorities. At the present time the one anxiety of the schoolmaster is to stimulate a keenness for games, and in many schools, especially perhaps preparatory schools, the games are even made compulsory. And of course the reasons are obvious enough. It keeps the boys out of mischief, gives them something to do, which is not only healthy but amusing, and valuable educationally, it provides healthy topics of conversation, indeed the advantages are so many and obvious as to be hardly worth detailing. But, unfortunately, it is not possible, or at least it is very difficult to keep games in a subsidiary position, and yet stimulate keenness and energy in the lazy and slack, and the loafer is of course the schoolmaster's dread. The result is that the games inevitably become the important feature of the school; the boy, only too prone to consider them so, finds that the master, his parents, their friends are often more keenly interested in his prowess at cricket or

football than in his work. The professional coach has crept now into the private school; the little preparatory schoolboy goes up to the public school with a reputation, carefully schooled in correct form; the games are organized by the masters, the natural rough and tumble and struggle are eliminated. All through his life until he leaves the University the boy is taught to believe that games are the only thing that matter. This tremendous emphasis on games does more than anything else to increase the tendency of a school to produce a type, and kill off individuality; because the compulsory game makes it impossible for any boy to follow any particular task or bent he may happen to have.

Not only does this glorification of games have a demoralizing effect on the boy and his outlook on life, but it is robbing the games themselves of much of their value. They are becoming over-specialized, systematized, looked after and hemmed in by regulations; matches between chosen teams take the place of active participation. We are rapidly getting into games the very evils that we are trying to banish from our work. Instead of forcing the boy into grooves in his game, we want, especially for the younger boys, spontaneity, freedom and careless abandon. When I see small boys playing cricket with faultless pose and a stiff but carefully accurate bat, I long for the old days when a pull to leg was not a crime.

I know that the answer to the problem is a difficult one, and depends very largely upon public opinion, which in turn presses on the schoolmaster, but the school is helping to form public opinion, and some means should be found to put games in their proper place, so that as the boy approached maturity he would realize the due place and the ultimate importance of games, and with them of course, sports of all kinds, hunting, shooting, fishing, which are after all only another form of game except on the rare occasions when we require the result for food.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Rousseau on Child Study.—"We know nothing of childhood [in 1762]; and with our mistaken notions the further we advance the further we go astray. The wisest writers devote themselves to what a man ought to know, without asking what a child is capable of learning. They are always looking for the child in the man, without considering what he is before he becomes a man. It is to this study that I have chiefly devoted myself, so that if my method is fanciful and unsound, my observations may still be of service. I may be greatly mistaken as

to what ought to be done, but I think I have clearly perceived the material which is to be worked upon. Begin thus by making a careful study of your scholars."—"Emile," translation by *Miss Barbara Foxley, M.A.*, Everyman's Library, 1*s*.

Sports and Prizes.—"What have been the results of this change? [the abolition of prizes for sports.] On this point there is no possibility of mistake. In the old days, when there was a material prize to compete for, the number of competitors entering was about a hundred; it was considered quite good if we got a hundred and twenty boys entering [Manchester Grammar School]. Seven years ago we abolished this system of prizes, and now we consider it a bad entry if there are less than six hundred boys competing in the different events. As to keenness, there has not been a year in which one at least of the old records has not been beaten, and frequently it has been not one, but two or three. Nor are there any other concomitant changes which can account for the improvement. What changes there have been have been adverse rather than otherwise . . . It has brought the athletic sports into line with the best traditions of our best school games, and made them conduce to the corporate spirit of the school."—*J. L. Paton, M.A.*, on "Prizes—Athletic and Other," in *The Educational Times*, November, 1911.

Types of Attention.—"There are three points about which the educational psychologist must be perfectly clear:—(1) That there are three ["Volitional, Spontaneous, and Enforced"], not two, distinct types of attention. (2) That the fundamental and permanent type is Spontaneous Attention. (3) The Volitional Attention, which has in the past been the only type studied, though important, is of secondary importance, and that, in the words of Ribot, it is 'precarious and vacillating in its nature,' and 'derives its whole being from Spontaneous Attention.' An understanding of the conditions determining these types of Attention and their relation to one another is of the first importance to the teacher. Such an understanding, as far as the needs of educational psychology are concerned, can only be obtained from the side of Interest."—*James Drever, M.A.*, on "The Kinds of Attention," in *The Journal of Experimental Pedagogy*, November, 1911.

Training the Eye.—"Eye-movements need training in all children till they have acquired the faculty of accurately and steadily looking at objects and their parts. Exercises in eye-movements may be conducted in various ways: tell the children to look at a small object you hold in your hand, and to follow it with their eyes without moving the head; they may then look at a ball as it passes through the air. Eyes

are more readily fixed by a bright object, as a bright coin, than a dull one; gold has generally greater attraction than silver. It is useful in difficult cases to use a small lamp; or employ a small hand mirror and a well-screened lamp, so as to reflect its light on the ceiling and wall, which young children like to follow. Again, you may name known objects in the room, or pictures, telling the pupils to look at each, thus quickening their movements."—*Dr. Francis Warner* in his book on "The Study of Children."

Practical Geography in London.—"In the summer term we hope to have several geographical expeditions, and to take up elementary surveying in Kensington Gardens. There is already a Junior Geography Walk, during which we are studying the geographical possibilities of Kensington Gardens. The children have noticed the following points: that water makes stones round; that there are currents caused by the wind in the round pond; that there are different kinds of soils; the nature of clay, and that it is found underneath the surface soil of London; that there are miniature islands, gulfs, and bays in the Serpentine; and many other things as well."—*Miss Agnes Nightingale*, on "Preparation for the Formal Study of Geography in London," in *The Parents' Review*, November, 1911.

Children and Knowledge of Sex.—"It is my opinion that as children grow older they should be led gradually by instruction with regard to plants and animals nearer and nearer to the deduction which will force itself upon them of its own accord. The logical conclusion should dawn on them by degrees as a secret of high and lofty import, and the final word should be said by themselves to themselves in the chaste solitude of the soul. Amongst the children who know everything, and say everything, I have never come across one who attracted me. Between parents and maiden, between parents and their adolescent boy, with intense seriousness, the final word may be spoken, but never between parents and young children."—*Otto Ernst*, in "Dolls—Dead and Alive," translated by *A. C. Caton*.

The School of To-morrow.—"The boy and girl of to-morrow, even in our common schools, must be given work courses and play courses as well as culture courses. Our common schools must become at one and the same time schools of health, schools of occupation, schools of play, and schools of study. I venture the suggestion that the kindergarten of to-day is the forerunner of a new form of elementary school. Games and play, arts and crafts, industries and occupations, properly graduated and adapted to the varying needs and capacities of children, will constitute a larger and larger part of the coming

programme. Our course of training at least will begin and end in the making of things, everything which a child can learn to make. The instincts of play, curiosity, pride, imagination will be utilized under the leadership of teachers who will work shoulder to shoulder with children. The chasm between work and play will be bridged."—*S. L. Heeter*, on "The School of To-morrow," in the *Educational Review* (U.S.A.), December, 1911.

NOTES.

The Next Annual Conference.—The Principal of the London University has been good enough to give permission for the conference—on May 9, 10, and 11—to be held in the University buildings at South Kensington. The subject for the conference is : *The Health of the Child in relation to its Mental and Physical Development*, and the following papers have been arranged:—*Mental Hygiene in relation to the Development of the Child; Instruction of the Young in Sexual Hygiene*, by Dr. Eric Pritchard ; *Influence of Defects of* (1) *Vision*, by Dr. Bishop Harman, *and* (2) *Hearing in relation to the Mental aud Physical Development of the Child*. It has been decided that the papers shall be printed in advance and available for members of the audiences. They will be taken as read, and the writers will be allowed twenty minutes to introduce a discussion on them. It is hoped, in this way, to get vigorous and helpful discussions on the subjects. Sir James Crichton Browne will give the Presidential Address on May 9. A hospitality committee, consisting of ladies, has been appointed, with Miss Kate Stevens as Convener, and Miss K. G. Cash, 36, Hunters Buildings, Borough Road, London, S.E., as Hon. Secretary.

Diet in Schools.—The National Food Reform Association "propose calling at an early date a conference of Heads of Public and Private Schools, together with members of their staff, to consider the feeding in such institutions" in the belief that an "exchange of views among those responsible for the health of so important a section of the next generation during the critical years of body-building, could not fail to yield valuable results." Dr. Shrubsall and Mr. Durrie Mulford have been appointed, as representatives of the Child Study Society, London, on the committee of the conference ; and the Council of the Society has expressed the hope that elementary schools will receive consideration.

Juvenile Probation in Italy.—"From the interesting Journal of the Italian Juvenile Probation movement we learn that the Roman Society have appointed a 'work inspector' to visit the boys at work, enquire into their conduct as well as into that of their employers and other superiors, and their surroundings and conditions. Prizes will be given for industry, and two registers are to be kept, one showing the occupation of, and work done by, each boy, and the other giving names of firms willing to give employment."—*The Penal Reform League Monthly Record*, December, 1911.

Lecture Lists.—EDINBURGH SOCIETY :—Wednesday, January 17, *The Care of the Feeble-minded*, by Dr. G. Devon ; Tuesday, February 6, *Home Lessons in Secondary Schools*, a joint conference with the P.N.E.U. at U.F. St. Andrew's Hall, Drumsheugh Gardens, at 8.30 p.m. ; Wednesday, February 21, *Facts, Appearance, and Art, in relation to the Child*, by H. Wyse, Esq. ; Wednesday, March 13, *The Study of Individual Differences in School Children*, by Professor Green. Meetings at 8 p.m. in the Edinburgh Provincial Training College, 16, Chambers Street, unless otherwise stated. LONDON :—Thursday, February 15, *Control during Adolescence*, by

Captain A. St. John ; Thursday, March 28, *The Experimental Study of Memory*, by Miss Beatrice Edgell, M.A. MANCHESTER :—January 26, *Punishment in Schools*, a discussion opened by Professor Findlay ; February 23, *Food and the Fastidious Child*, by Dr. Catherine Chisholm ; March 22, *Practical Studies in Geography*, by T. W. Erskine.

First International Eugenic Congress.—This will be held in London, July 24 to 30, 1912, and is organized by the Eugenics Education Society. One of the topics to be considered is, "The Place of Eugenics in Educational Systems." All communications should be addressed to the Hon. Secretary, Eugenics Education Society, 6, York Buildings, Adelphi, London.

CORRESPONDENCE.—Co-Education.

SIR,—I think that Mrs. White Wallis's suggestion that we should deal with the co-education of adolescents in two sections, viz. "fourteen to seventeen or nineteen years, and nineteen to twenty-one," is a very helpful one. For myself I believe fourteen to seventeen and seventeen to twenty-one is the best arrangement of the period, because this covers, most certainly, the change from school to university (including university and other college) life and is almost the same as that suggested by Dr. Kingsford. While the idea of preparation for "freedom in life" is important, it seems to me not to be essential, since it should have been prominently in view from a much earlier time, say ten to twelve.

It seems to me that the letter by "I de C" is a valuable contribution to the discussion, for it gives real facts and experiences clearly and pertinently. What is Dr. Kingsford's reply to the conclusions "I de C" draws from her own education? Dr. Kingsford says he finds it hard to follow my argument—it was only a challenging statement—about family life. Let me put it to him this way: education involves the training of the intellectual, moral, and physical elements in human nature, and these must be trained more or less, badly or well, in the home as well as in the school. Which is right: the home in which boys and girls intimately mix, or those schools in which they are absolutely isolated? Or, as Mrs. White Wallis suggests, is the "natural" or the "monastic" system the better?

Dr. Kingsford asks how much co-education will remain when the separate needs of the sexes have been met. My reply is: by far the greater part. Do not boys and girls learn nearly all the ordinary school subjects, many games, practical morals, etc., in the same way? Of course slower or quicker, more or less, but this is true whether they are taught separately or together, and is amply provided for by proper classification. I ask Dr. Kingsford to give the subjects in which he holds that the sexes cannot, or should not, be taught in co-education classes.

A. COED.

SIR,—You have asked me to try to condense into the few lines of a letter the ground of my belief in co-education. I believe in it because I believe on the one hand in education, and on the other in sex-copartnership. Education is slowly teaching us—it has no other purpose—how to behave. And sex-copartnership is the fine flower of behaviour. The essential condition of all successful education is—as I think—that sound foundations be laid in childhood and adolescence. And there must the foundations of sex-copartnership also be established.

"We share the primal curse;
Together shake it off, say we."

Do not ask me to point to results. By their immediate results you may perhaps test the builders of a house, but not the builders of a nation. England to-day is what her education—including her religion—has made her. There are things to be proud of, but how much more to make us ashamed! My faith in education and co-education alike rests not so much on what they have done, not so much even on what they are doing; it rests on what they are destined to do when perfected instruments.

That was the character of my faith when I was first called to the co-educational field some twelve years ago. Practical experience has only strengthened it. And all the arguments of all the objectors have done nothing to shake it—if only because they are concerned with schools as they are and not with schools as they might be. But even in schools as they might be I should not propose an identical education, either physically, intellectually, or spiritually, for all boys and girls. I should never indeed propose an identical education for any two human beings.

The perfected instrument of education will adapt itself without loss to individual needs and individual differences—no more profound between the sexes than between the members of one sex. But its vital essence, adjusting and reconciling all individual differences, will be the great bond of a common humanity—greater than sex, or race, or creed, greater even than individuality itself.

JOHN RUSSELL.

REVIEWS.

The Educational Theory of Jean Jacques Rousseau. By WILLIAM BOYD, M.A., B.Sc., PH.D., Lecturer on Education in the University of Glasgow. Pp. vii., 368. Longmans, Green & Co. 5*s.* net.

This is a valuable book for lecturers on education, advanced students, and all who wish more fully to understand Rousseau's views on education. Dr. Boyd accepts Rousseau's own suggestion "that the right method of approach to his theory of education is not through the *Emile*, but through his whole social philosophy," and has excellently worked out an exposition on these lines. The book can be very cordially commended; and, one may add, might well be read in connection with Miss Barbara Foxley's fine translation of the *Emile* just published in the Everyman's Library (1*s.* net). H. H.

The Journal of Experimental Pedagogy. Edited by Professor J. A. GREEN, Pp. 92. Longmans, Green & Co. 1*s.* net.

Another excellent number. It contains papers on *Tests of Higher Mental Processes*, by Cyril Burt, M.A.; *Principles of Handicraft*, by Dr. T. P. Nunn; *Social Class and Mental Proficiency*, by W. H. Winch, M.A.; *Evidence of Mental Fatigue*, by Gladys W. Martin, B.Sc.; *The Creation of a Memory*, by E. P. Culverwell, etc.; and the good news that the journal will be published three times a year instead of twice.

Outlines of Education Courses in Manchester University. Pp. 189. Sherratt & Hughes, Manchester.

This is primarily intended for the students at the university, but is made available for others. It contains syllabuses on the following topics: *The History of Education in England*, 1800–1911, by Professor Michael Sadler; *A Systematic Review of the Principles of Education*, by Professor J. J. Findlay; *Landmarks in the History of Education with special reference to the Education of Young Children*, by Miss Caroline Herford; and *The Mental and Physical Life of School Children*, by Dr. Sandford, Miss Rankine Brown, and Miss M. A. Fountain—the last-named being of special

interest and value for students of scientific child-study. Each of the syllabuses contains numerous references to text-books, etc.

Dolls—Dead and Alive. By OTTO ERNST, translated by A. C. CATON. Pp. 42 A. C. Caton. 1*s.* 6*d.* net.

One of Mr. Caton's delightful translations in the "Mother Books," and equally charming and helpful to read. Should be published in much cheaper form so that thousands of mothers and fathers might read it.

In the Land of Nursery Rhyme. By ADA M. MARZIALS. Pp. 118. H. R. Allenson. 1*s.* 6*d.* net.

The substance of the old rhymes put into prose stories, and well put.

A Garland of Verses for Young People. By ALFRED H. MILES. Pp. vii., 247. Stanley Paul & Co. 2*s.* 6*d.* net.

A generous and widely gathered collection of verses—between seven hundred and eight hundred poems. The author should have added to his title: "and about young people for cultured adults." A helpful reference book for parents and teachers.

La Revue Psychologique. June, 1911. Four times a year; 10 francs. 35, Avenue Paul de Jaer, Brussels.

This important publication, now in its fourth year, though it has won for itself well-deserved recognition in Europe, is but too little known in Britain. It is edited by Mlle. Dr. Ioteyko, the Director of the laboratory of physiological psychology of the University of Brussels, and treats of normal and abnormal psychology, the physiology of the nervous system, child-study, experimental pedagogy, and educational hygiene, Among the subjects considered in former volumes have been in Vol. i., 1908, "The Measurement of Muscular Force and Sensibility," "American Methods of Education," "The Psycho-Physiology of Grief," "Over Pressure," "The Physical Education of the Child," and "Determination of Memory Types." In Vol. ii., 1909, appeared "Illusions of Memory," "The Measurement of Professional Fatigue," "The Rôle of Attention and of Repetition," "Mirror Writing," "The Psychology and Pedagogy of the Sexes," and "A Pedagogical Study of Vision." In Vol. iii., 1910, among the twenty-seven original articles were "The Reform of Reading and Writing," "Suggestion in Education," "Over Pressure," "The Methods of Teaching Foreign Languages," "Sensorial Education," and "Coloured Vision." These titles sufficiently show the wide and practical scope of the review.

Of the articles in the issue for June, 1911, two are of primary importance. One contains the results of some observations upon three little girls, in part a continuation of, and in part a reply to, criticisms made upon, a former article published in the *Revue Psychologique*, December, 1909. The account of the nourishment of the children, of their increase in weight and height during nine, eight, and six years respectively, and their detailed answers to the Binet Tests, form not only an interesting but a valuable contribution to the data for Child Study, which parents of young children, together with those who are seeking to generalize upon similar questions would do well to study this and the preceding article.

The other notable contribution is by Mlle. Dr. Ioteyko, and deals with the illusions connected with feeding. It runs to nearly forty pages, is most interesting and suggestive, and would be read with pleasure by all interested in food reform, and who believe with the author in the need of instruction in food values.

A pleasing feature of the review is the "Chronicle" in which brief summaries are given of current movements and ideas. T. G. T.

L'Educateur Moderne. Ten times a year; 11 francs. Paulin & Cie., Paris.

To these numbers the editor, Mr. G. Compayné, has contributed an account of Frœbel's life and pedagogic principles, still to be continued. This is timely, in view

of the recently inaugurated movement in France for the introduction of Frœbelian methods into the schools, testified by the formation of a French Frœbelian Union. It is curious how, in the education of young children, France has lagged behind other countries, and how the impulse for reform seems now to have come from several directions.

In the November issue Mr. Peeters contributes a translation of an article by a Chinese professor on the new educational problem in China, which helps in some measure to explain the recent uprising. M. Roger Cousinet describes the "New Method of Teaching Drawing," which has recently been introduced by Mr. Gaston Juénioux, and which in essentials appears to be a protest against the sole insistence upon correct execution, and a claim for an appeal to the spontaneity of the child. In this issue also M. Cousinet gives a brief critical notice of the work of the late Prof. Binet. T. G. T.

L'Education Familiale. July, October, November, December, 1911. Ten times a year, 6 francs. 44, Rue Rubens, Brussels.

The emphasis in this review is placed upon the moral and physical development of the child ; its intellectual development receives only incidental treatment, and that rather in the way of criticism of the school regime, as in "The Faults of Modern Education," which runs through the four issues and a sympathetic article on "The First Days at School," in November and December issues. Most prominent appears the question of child feeding ; in the July number this is treated in three short articles, concerning the first few months, infantile illness, and the years from three to seven ; the last subject is continued through October, November, and December. The contributions are always brief, with a brevity that verges on scrappiness, but some are good enough to make one desire more. T. G. T.

Bulletin de l'Education Morale de la Jeunesse. October, 1911. 7 francs per annum. G. Revel, 41, rue Dareau, Paris.

This little publication, the organ of the French League for the "Moral Education of the Young," is well worthy the attention of all who are interested in this subject. Though mainly concerned with moral training, the importance of the physical and intellectual developments, particularly of young children, as bearing upon the former, is recognized and considered. Recent numbers have given some appreciative accounts of the methods of M. Montessori, consequent upon a visit which M. Pujol, the secretary of the League, paid to her schools in Rome during last summer ; a school upon similar lines will be opened in Paris shortly. This issue contains articles on "Preparation for Self Education," by M. Dr. Schultz, and on "The Montessori Method," and "Children's Gardens," by M. Pujol, all of which will well repay consideration. T. G. T.

Publications Received.—*Journal of Education ; Educational Times ; Parents Review ; Educational Review* (U.S.A.) ; *La Revue Psychologique ; List of Degrees granted at Clark University and Clark College*, by Louis N. Wilson ; *List of Papers in the Field of Religious Psychology presented at Clark University*, by Louis N. Wilson ; *Bibliography of Child Study*, 1908–9, by Louis N. Wilson ; *Bibliography of Articles relating to the Study of Childhood and Adolescence*, by Theodate, L. Smith ; *Annual Report on Columbia University* (1911), by Dr. Murray Butler ; *Quackery and Medical Law Reform*, by Henry Sewill.

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Child-Study.

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ADOLESCENCE.

By Sir THOMAS CLOUSTON, M.D., LL.D.

A Paper contributed to the Halifax Child-Study Conference, July 14, 1911.

There are abundant physiological and psychological reasons for the division of human life into the epochal periods of childhood, adolescence, maturity, the climacteric, and old age. The period of adolescence I would fix from puberty until full maturity, *i.e.* from the age of fifteen to that of twenty-five. There are distinct differences between the growth in the bulk and weight of any organ and the development of its special function. The functional capacity, *i.e.* the output of work, cannot be estimated by mere bulk or weight. The human brain has nearly attained its full gross weight at eight years of age, but its powers of mind and its control over muscular movements are then only feeble and elementary. At eighteen it ceases to grow in bulk and weight, having only gained a fraction since the age of eight. The vital machinery of which the human brain is composed is so infinitely complicated and delicate, and the work that machinery has to do is so inconceivably subtile and important that it takes the seventeen years of life, from eight to twenty-five, to perfect it after it has almost attained its gross bulk. The last ten of those years, from fifteen to twenty-five, are the most important of the seventeen, because it is during them that all the higher bodily, mental, and moral qualities of mankind arise and grow to perfection. The second strongest instinct in nature, viz. the reproduction of the species, then comes in with all its distinctive accompaniments, physical and psychical. It is during the period of adolescence that the real evolution and education of the powers and faculties which constitute the higher life, and fit men and women for playing their part in the social, industrial, and political edifice we call "the family," "society," and "the state" take place. Any one who to-day treats the great educational

problem without regard to the evolutional and physiological knowledge of the present time will certainly miss two of its essential factors, and will be likely to come to erroneous and misleading practical conclusions. The educational problem so studied will also lose half its inherent interest. I cannot help thinking that the keenest stimulus to work of every kind lies in our getting hold of the principles that underlie all practice. Now one of the basal principles of successful education must be what our continental scientists call the "psycho-physical parallelism" between mind and brain. This means that every mental fact, and faculty, and every potentiality of acquiring knowledge necessarily imply certain physical and physiological facts and potentialities in the human brain. During the educative process the mental qualities of attention, imitation, curiosity, acquisition, memory, intelligence, sense of duty, and reasoning should in the teacher's mind be assumed to be necessarily co-related with physical, physiological and bio-chemical parallel processes going on in the brain, and when one speaks of "the brain" one means really those cells of that organ which are the vehicle of mind.

It would be easy for me to take up this whole paper on what we call the higher human brain cell, so far as we at present know it—and our knowledge of it is still most imperfect. Every year that knowledge is being added to. We do know that looking at all nature and all life the human brain cell is the most wonderful thing, because without it mind could not be apparent in this world. In a sense mind would not exist. If there is any truth in the doctrine of evolution, and few now doubt it, the brain is not only the highest thing as yet evolved, but it and its work have been the aim of all evolution from the beginning of life. It is the apex of that gigantic pyramid the base of which consists of the swarming millions of unicellular life. Not only do the capacities and functions of its cells transcend those of any other cell in nature, but their structure too is altogether unique, and unlike and beyond the structure of any other known cells.

Most forces, energies, and capacities must be studied through the physical agents or machinery by which they are produced or conditioned. On this principle the whole facts of adolescence, mental and bodily, should be studied primarily in reference to the developing brain cell. If our knowledge of this was anything like perfect evolutionally, hereditarily, and physiologically, which is far from being the case, then many of the problems of adolescence which are now obscure would become plain to us. It is manifest to the student of heredity and neurology that the brain cell, though it has infinite innate potentialities, yet is more dependent for its complete and multiform development on its

environments than anything we know in nature. Under the influence of certain environments its possessor may simply have to do the work of a day labourer. Under certain other conditions it may be called on to do the work of a statesman or a sovereign. All the complex qualities, the sum of which we include under the term "character," reside in the brain cell. The power of work, the capacity to learn, every quality that constitutes a good teacher or a good scholar must be a brain cell quality. What we call its "reactive power" distinguishes it from all other cells in the body. It reacts to, and, as it were, sympathises with, every kind of stimulus in heaven and earth. It should, if normal, have an innate sympathy with and respond to all environments, impressions, and efforts that are favourable to its development, and it should be able to resist environments and impressions that are not harmonious with or not favourable to its higher development and work.

The modern scientist holds strongly that some knowledge of physiology is essential not only to the doctor and the hygienist, but to the statesman and sociologist if the best is to be done for the right progress of mankind. If that is true, then it must be equally certain that a general knowledge of physiology and a particular knowledge of the brain cell must be necessary in the case of the teacher if he or she is to do their work efficiently. None of such higher work can be done well except the principles underlying it are understood and acted on. It makes all the difference also to the interest taken in his work, and to the mental satisfaction of doing it, whether those principles are realized.

In the development of the brain cell we have to think not only of its physiological capacities, but of its pathological risks. We want to stimulate its reactive power, but we also endeavour to avoid its becoming too "explosive." We desire to have the quality of keenness, but this must always be combined with and capable of being regulated by sufficient inhibition. A young man or woman must have enthusiasm, imagination, idealism, and an innate feeling that certain conduct and thinking and feeling are right and that others are wrong, but in all those things there must be a *via media.* There is a tendency for many brain cells during development to become over-intense in action, to lack staying power, and to lose their resistiveness against disease. Many of our social excitements, and, I believe, also some methods of teaching, are not in accordance with physiological laws, and tend towards unhealthy lives. It is not the immediate facts of the brain cell and its action we must look to, but its future condition during mature life, when its power of development has come to an end and it is doing its daily grind in the world's work.

The power of the brain cell to receive impressions from without, to store them up so that they may be able to form memories, is one of its most marvellous and as yet obscure qualities. This power is greater in adolescence than in any other period of life, in regard to certain impressions at least. The intimate structure of the cell, its molecular constitution, is altered by every sight and every sound which reach it by the eye and ear. Try to realize, if that is possible, what that means, and especially what it means in regard to the consciousness, this personality, and the life of the possessor of such a cell. Things good and bad, favourable and unfavourable, all must be received as impressions on the brain cell. They must enter into the life of the individual in some form or other. No doubt there is a filtering process which is carried out by the faculty of attention; the things we hear and see and think about, which are not attended to, are either not registered in the brain cells, or their registration is of such a faint character that they cannot be recalled in the shape of memories. The training of this faculty of attention in adolescence should be carried out on scientific principles, so that it may become acute and accurate, and that the right and favourable things should be attended to and the useless or unfavourable ones not attended to, and so left unregistered. Every brain cell is like one of the pages of a closely-printed book. It contains marks which mean ideas or information that commonly lie hidden, but may be used at any time they are wanted. The sum total of the pages—the book—is the whole brain composed of its three thousand million of cells, each of which is, as it were, crammed full of letters and words with a meaning. No human imagination is really capable of taking in the full import of the facts in regard to those brain cells, far less of anticipating the knowledge which we shall by-and-by attain about them.

We have to take into account not only the qualities of the cell structure and its protoplasm, but of the ways in which one cell is linked to another in the same group, and the ways in which different groups have direct connections with each other. Flechsig has demonstrated the method in which in early childhood the connecting apparatus between different groups of cells is formed. Strands of fibres are literally pushed through the substance of the brain so as to make those connections—the first of them being made between the centres that are of most mental importance, that is between the centres of sight and the mental centres in the fore-part of the brain. But for this process of "association" and connection the cells would be in the position of mere telephone receivers without wires to connect them with all the other telephones in the same city.

Assuming that we thus have an apparatus rightly constituted, its cells receiving impressions during the whole waking life, we have then to think of the ends and objects of this elaborate machinery. A mind-apparatus packed with memory impressions is by itself only a means to an end.

There are two great ends to be kept in view; the one is the utilization of those memories for the efficient work of life, and the other is to keep the brain-cell and the whole organism in such a state of health that it may be able to transmit its qualities, not only unimpaired, but improved to future generations. Looking over the list of brain faculties that are of most essential importance to life, no physiological psychologist can have any hesitation in selecting, not the power of reasoning, nor that of feeling, nor even that of memory, but the power of inhibition, that is, of control. Looking at life in its primordial manifestations, that is, at the uni-cellular organisms, the physiologist recognizes that a form of control is an essential part of even such a simple existence. If there were no such faculty of control, the nutrition of each such simple organism would go on and on until its size was limited simply by the nourishment it could obtain. As it is, every such cell attains only the size and the form of its ancestry, some quality of control stepping in and preventing it growing any larger. This may be called the control over nutrition which is inherent in every animal and in every organ from the lowest to the highest. Then, when we have a circulatory apparatus developed and a rhythmical muscular beat of the primitive heart, the number and the force of such beats must be regulated and controlled by some agency. When the nervous apparatus is first developed low down in the scale of life, its two great functions are, first to stimulate action, muscular and nutritive, and, secondly, to control and regulate such action. After the circulatory apparatus has developed into an elaborate system of a heart pump with four chambers, with arteries, veins, and capillaries, we find that it is provided with an elaborate nervous apparatus to quicken or slow the heart-beats, and to dilate or contract the blood-vessels. That apparatus consists of ganglia, or groups of nerve-cells, which stimulate, and ganglia which inhibit action. We can now demonstrate by experiment as well as in disease that, when the stimulating nervous ganglia are excited to undue action, the beats of the heart will rise from seventy-four per minute to twice that rate, while if the inhibitory ganglia are unduly stimulated, the heart-beats will sink to twenty per minute, or be stopped altogether. This nerve function of inhibition controls voluntary and involuntary muscle, controls nutrition, and controls the secretory functions of all glands. Many persons have no power to lay on fat or to keep up a normal bodily weight

and nutrition, and others lay on too much weight, just because the nutritional inhibitory nervous power is out of order. The whole muscular action of a living being is necessarily under the control of the motor nerves. We can, by using certain drugs, so paralyze this control that the muscles go into continuous involuntary action, and we have convulsions resulting. The disease of epilepsy is essentially one where the inhibitory nervous power over the muscles is interfered with. We have other cases where there is muscular paralysis through over-much inhibition.

Now, when we pass into the highest region of nervous action, "the highest levels of the brain," as our most distinguished fellow-countryman, Dr. Hughlings Jackson, has called them—that is, the cells which are the vehicle of the mind—and when we apply to those the knowledge of the laws of inhibition which we have acquired from a study of the muscular apparatus, we find not only that there is an inhibitory mental faculty, but that this faculty is of equal importance to the mental life and conduct of man as the cardiac inhibition is in regard to the circulation of the blood. Look, first, at mental inhibition over muscular action. In a healthy organism this should be almost absolute. A man can walk or stop walking, can play on an instrument or not play on it as he wills. In regard to sensation or feeling, the inhibitory power of the mind, which means that power of residing in the mental brain-cell, comes in everywhere. A man is hungry, that is, has a conscious feeling of a desire for food. He suddenly hears bad news, or has to act quickly, and the appetite is inhibited and felt no longer; or there is a situation of great danger with its accompaniments of intense fear and immediate call for action. In some persons this will produce a complete paralysis of feeling and action, so that there is no conscious terror and no action to avoid the danger. The same mental inhibition which stops the feeling of hunger will also stop the secretion of the digestive juices in the stomach. If food is taken under such circumstances, it will lie undigested in the stomach. Taking still higher examples of mental inhibitory power over a purely mental act, a mother loses her child, and feels such grief that she is disinclined to do the work in life that lies before her, but her other children must be cared for, her household duties must be done, or her livelihood must be earned. She inhibits the feeling of grief and goes to work to do those necessary duties. A hysterical girl, who is vain and ostentatious in disposition, sees a pearl necklace, and the desire for it inhibits her moral principle of honesty and the fear of the punishment which she knows will be inflicted on her if she steals it. The faculty of inhibition, we thus see, rises at last in mind to be the chief factor of the moral sense

and of conduct in life. Looking now at inhibition as it is developed in a human being from birth onwards, Darwin found that a child first exhibits mental inhibition at about the age of thirteen months. Previous to that no such faculty exists. From that time there is a steady progress in the development of this great faculty. Through good heredity—and the power of inhibition is a strongly hereditary quality—through teaching, through punishment, through reward, mental inhibition, the power of control, and the moral sense are slowly developed in a man or woman. It has reached a certain development in many respects at the beginning of adolescence; but yet a study of boyhood shows that it has not then arrived at such a stage that it is properly able to regulate impulse and desire, passion and temptation. A society of men and women whose power of inhibition was at the boyhood level could not hold together, and could not attain civilization. The history of humanity shows that civilization first began through the simple gregariousness of human beings. Then there was developed in each gregarious group a strong man with a powerful inhibition, who became the tyrant, the controller, and the regulator of the community. By strong measures of primitive justice, he inhibited among his subjects, theft, murder, idleness, and unsocial practices generally. Civilization really means increase of the mental inhibitory faculty as a general possession of mankind; and this increase, to the extent which makes the higher civilized life possible, takes place during the physiological period of adolescence. Its vehicle is the brain-cell which during that period undergoes such development that control, altruism, and high motive take the place of hurtful egotistic desire, purely selfish action, and anti-social practices. The faculty is there at the beginning of adolesence, with a certain capacity of development. It is the chief duty of the teacher and the parent to stimulate and regulate that development on right lines, so that morality, duty, and the civic sense shall be universally diffused among mankind.

Adolescence has always been studied by thoughtful educationalists, and all statesmen have realized that it was the crux period of life. If any of you desire to know how it has been looked at by hundreds of thoughtful writers you will find their opinions in Stanley Hall's monumental book on "Adolescence: Its Psychology and its relation to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education." Dr. Hall's treatise is so exhaustive in its quotation from so many authors as to be almost paralysing to the reader. Being a specialist the peculiarities and abnormalities of adolescence are perhaps too strongly treated of, while its normal characteristics and its ordinary course are not sufficiently accentuated, but no one can

pretend to have thoroughly studied adolescence without reading this book.

Looking at the brain from the mere anatomical point of view, our present knowledge does not fully co-relate itself with the mental phenomena of adolescence. As we have seen, the actual bulk of the brain does not increase much from puberty to eighteen, and does not increase at all from eighteen to twenty-five. Microscopically the cell of a youth of fifteen could scarcely be distinguished from the cell of a fully developed man at five and twenty, but that results from the poverty of our present means of examination. We find throughout biology that improved and more complicated function always implies more integrated and complicated structure. It may be assumed in accordance with this law that the brain cells of a man of twenty-five are more matured, more resistive to disease, more stable, and that the communications of each cell with the other cells of its own group and of one group with another are far more precise and numerous than in a boy of fifteen. Probably the fibrils within each cell are more numerous and there is a greater difference between the larger and the smaller cells—the larger being more highly integrated. The non-medullated, fine fibres that run over the surface of the convolutions are more numerous. Those scarcely exist at birth, but soon develop in enormous numbers so as to form a most delicate envelope to the whole brain, connecting one centre with another. The actual number of cells is supposed to be the same in the brain from birth until they begin to atrophy and some of them disappear in old age, but their quality is certainly very different at five and twenty as compared with the earlier ages.

(*To be continued.*)

ADOLESCENT GIRLS FROM THE VIEW-POINT OF THE PHYSICIAN.

By MARY A. D. SCHARLIEB, M.D., M.S.

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(*Continued from page* 125, vol. iv.)

Now to come down from the sentimental and abstract to the concrete and practical. One of the first home lessons that the young people need to learn is that of punctuality. One knows that in too many

instances ablutions, devotions, and breakfast, are scamped for the sake of an extra quarter of an hour in bed, and thus the day begins badly, for the unwashed, unblessed, and unfed individual is by no means in the best frame of mind and body to commence the day's work. There is an acute dissatisfaction both of the moral and of the digestive system. And here perhaps one might mention the evils of the half-time system. In many great industrial centres a large proportion of the children divide their time between work, which is to some small extent remunerative in the present, and school, which ought to be the preparation for a far more remunerative future. The result is too often disastrous. Young girls and boys have no great capital of strength and energy; if this is expended on six hours' work there is a very small residue left for school. As a matter of statistics the half-time children have been found to be shorter, lighter, and less well developed than those not so severely tried: their nutrition is bad and their powers of endurance are small.

With regard to the school side of the problem they are seldom to be found in the standard appropriate to their age, indeed, they are stunted in mind and body, and we want another Mrs. Browning to sing again the song of the children; we want some one to awaken the conscience of the nation and to make it illegal for children and adolescents to work at anything but the preparation which might secure adequate remuneration in the future and healthy maturity. It is easy to urge that the poor father who hardly earns a living wage is most thankful for the few shillings that his children can add to the weekly store, but having admitted this, one must look with horror on the national and economic conditions that can make such a sacrifice of the innocents appear to be desirable. The stream of national life, none too vigorous, as is evidenced by our falling birth-rate, and which is sadly handicapped by the failure of many mothers to perform the maternal duty of suckling their children, is still further impoverished by this terrible overstrain which is imposed on many of our young folk.

These are some of the evil influences that militate against the welfare of children in the industrial classes. It is, however, doubtful whether the children of the rich entirely escape a danger, very different indeed in its origin, but which leads to much the same evil result. The mother who devotes to society, to a profession, or to philanthropy the time that she ought to give to her own family, is only too likely to cause a sad stunting in the nature of her young daughter. The mother, partly by her unrivalled opportunities and partly by her unique intuitions, ought to be the very best guide to her children; she ought to be their earthly Providence, the channel whereby the good gifts of food, of

warmth, of sleep, indeed of all physical blessings, are conveyed to her children.

Again, during the troublous years of adolescent life it is to the maternal instinct and ready sympathy that the sorely perplexed and harassed girl should be able to turn for guidance. If, however, that mother be too busy supplementing the father's income, immersed in society functions, or even seeking with uninstructed zeal the welfare of other people's children, home life cannot but be blighted and the children neglected to a greater or less extent. Admirable, indeed, perfectly marvellous, is the manner in which many well-born and highly-placed women fulfil their exacting functions. One needs to know quite intimately the wear and tear involved in necessary social functions in order to appreciate the labours of many women of the so-called "leisured classes"; all the same there is a time for all things, and the time when a mother has little children or young girls under her care is not the time which she should choose for devoting her best energies to work outside her family.

(*b*) *The School.*—A very important part of the environment of the young girl is her school. In the case of many children there is little choice; they have to go to the elementary or high school most conveniently situated; they have to take the education provided for them and to profit by it so far as in them lies. Therefore a fearful responsibility rests on the educational and other authorities to secure that the schools in which the great bulk of our future citizens are educated should be the best that can be provided.

To judge by the experience of other countries, notably of France, of India, and of some of our Colonies, the greatest mistake that can be made in the organization of a school is to put religious instruction outside the curriculum. Whether we be denominationalists or undenominationalists, we must all agree that the youth of our nation requires to have displayed before it day after day, year in and year out, that highest of all examples portrayed for us in the Gospels. There is no other hero so worthy of the children's devotion, there is no other example so worthy of their imitation, and there is no other example which bestows the power to imitate it.

Another essential in school life is the adaptation of the teaching to the pupils. The adolescent girl of to-day is the wife and mother of to-morrow, and according to what her future is to be must be the instruction given to her at school. Is it not possible that in too many instances the subjects taught are not those most likely to secure efficiency and happiness in the years of maturity? One desires most heartily that the children of the nation from the richest to the poorest should

have a large outlook on life, a varied mental diet, and greatly increased possibilities of that happiness that comes from adequate instruction and a well-stored memory. We should be glad to fill their minds with brave stories of the past; we should be glad to teach them how to appreciate the art and science of the present; we should like to cultivate in them an appreciation of our neighbours in the great sisterhood of nations; and, therefore, we should like them to learn the languages which would make them free of the literature and the society of France, Germany, and Italy. But after all, we cannot teach everything, and would it not be wise to limit the curriculum to those subjects which are likely to be of practical usefulness?

Elementary physiology, hygiene, and domestic science should be taught to all. A knowledge of these subjects would go far to secure that wives and mothers should know how to maintain health, should be able to appreciate the causes of disease, and should be capable and efficient housewives, able to make the utmost profit out of every sixpence.

(*c*) *The Nation.*—If the boy is father to the man, not only is the girl mother to the woman, but in a deeper and higher sense she is the fount and origin whence the nation itself springs.

With very few exceptions the women of the country bear the impress of the nurture and training they have received as young girls. During the years of adolescence the girl's nature is as wax to receive an impression, and during the course of the years which bring her to maturity her nature becomes as marble to retain.

Except under most unusual circumstances one cannot expect any real alteration of character after maturity is attained. What, then, is the responsibility of those who have to deal with the young girl at the most impressionable period of her life. We are told that "Love worketh no evil to his neighbour, therefore love is the fulfilling of the law," and undoubtedly love is the key that enables us to understand that great enigma, that most difficult of all problems, the conduct of life. Therefore, we want to teach the young girl to love her God, her country, and her fellow-men. But this love is a very different thing from the emotional and sentimental feeling that sometimes masquerades in its name. The love that is necessary to make the girl a Christian, a patriot, a good mother, and a good child, is a love which is founded on knowledge and reverence. It is therefore necessary that the growing girl should, so far as is possible, learn to know her relation to the Deity, her place as a member of that complex organism that we call the nation, and her duties in the smaller and simpler unit, which is the family. The longest of lives does not suffice to bring this knowledge to perfection.

It has been well said that "the day is short and the work is great, the reward also is great and the Master presseth; it is not incumbent on thee to finish thy work, but thou must not therefore cease from it," and so, although we shall never finish teaching, nor will the girl ever attain to an adequate appreciation of this knowledge, yet in face of much to discourage, and under the pressure of our own grievous imperfections, we must still go on and do our best to secure that the children of our day shall become wiser, stronger, and more loving than we ourselves have been.

Although at different points in this paper the question of management has already been in part considered, it would seem well in conclusion to gather together the threads, and possibly to emphasize some of the needs of young girls such as they present themselves to the consideration of doctors, educationists, and parents.

First, with regard to the one primal necessity of life—food. There is no time of life in which food is of more importance than it is to the young girl during the remarkable period of rapid evolution that we have been considering, and perhaps there is no time in her life when it is so difficult for her to have the sort of food most needed. The little child in the nursery is usually fed according to the wisdom, or the ignorance, of its parents; the young woman who has reached maturity, has, it is to be hoped, acquired some sort of a working knowledge of the needs of her own constitution, and unless she is really bereft of common sense, she will take such food as fits her to enjoy the duties and pleasures of life. But the adolescent girl has, in most instances, got beyond the discipline of the nursery, and yet she has no knowledge of hygiene and dietetics, either theoretical or practical, to guide her in her choice of food. On the contrary, the general incoherence and inco-ordination of her nature shows itself very specially in her choice of food. In many instances she selects such innutritious articles as buns, cakes, sweets, ices, and fruits, as her staple food. Now, no one can say that such things are bad in themselves, nor can they allege that they should be struck out of the girl's diet sheet, but the trouble is that they are not suited to be the foundation diet. One good and practical rule is, that the girl should in health have four good meals a day, and that she should take nothing between those meals.

Breakfast should consist in the first instance of some form of cereal food of which there is an ample variety—oatmeal porridge, Quaker Oats, Grape Nuts, Force, shredded wheat biscuits, bread and milk, and many others. In all cases, at least half a pint of milk should be taken. After this ordinary breakfast-dishes, such as bacon, eggs, fish, tongue, ham, etc., with coffee (which should be nearly all milk) may be allowed,

finishing with bread and butter, with marmalade or fresh fruit. Upon such a foundation a girl can cheerfully work for three or four hours, and requires nothing more until the middle-day meal. At the middle-day meal there should be a sufficiency, but not too large a supply, of plainly cooked meat, or fish, together with plenty of vegetables, and either pudding or fruit. The difficulty in the case of many school girls is that such a middle-day meal is altogether unattainable, it is not provided for them at school, there is no time to go home, eat a meal and return, and if the girl buys her midday meal it is pretty certain that she will buy it at a confectioner's, and that probably it will consist of sweet cake and a glass of milk. The meal at the confectioner's can never take the place of the properly cooked hot meal with its meat and vegetables, but if the girl really understood what was good for her she would buy meat or ham sandwiches, which are nourishing although perhaps not fascinating, and in many instances sausages are procurable.

For girls who have had a substantial meal in the middle of the day bread and butter and milk, or milky tea, is all that is absolutely necessary for afternoon refreshment, but in the case of those who have been unable to get a satisfactory early dinner the tea should be supplemented so as to more or less resemble the substantial breakfast. Girls who have had a light tea will require rather more supper than the others, but the evening meal should never be the chief meal of the day if any other arrangement is possible.

As a matter of fact, the chief requirements in the way of food are: one quart of milk in the day, two meals into which meat, or fish, or poultry enter, with a sufficiency of fresh vegetables and fruit, and two lighter meals. These articles of diet, in sufficient but not too great quantity, must be distributed as fairly as possible throughout the day, due regard being had to the circumstances of each girl's life. To one rule there should be absolutely no exception—young people need no alcohol, and therefore ale, stout, and wine should never enter into their dietary. The time is not so long gone by when it was thought an advantage, especially in the case of delicate girls, and in the case of girls who had to work very hard, that they should have a little alcoholic stimulant; luckily, these days are gone, and with them the risk of much indigestion, functional at first, but frequently leading on to grave organic disorder, not to mention the extreme danger that a habit may be formed for needing and expecting stimulant, and of indulging in it in a constantly increasing amount.

The second primary necessity of life is sleep, and of this there is no doubt that young people get far too little. Up to the end of childhood twelve hours is about the right allowance of sleep, and all through

adolescence nothing less than ten hours suffices. It is, however, quite impossible that young people who are allowed to sit up to nine or ten o'clock at night, either at their lessons or for recreation, can have the requisite amount of sleep, because in nearly all instances they have to get up at seven in the morning in order to have their breakfast and be ready for school. All adolescent girls ought to be not only in bed, but asleep, by nine o'clock, and therefore they should retire at eight p.m., or soon after.

One knows quite well with what disapprobation this advice will be received by the girls themselves, and even by some of their elders. The argument is that the girl gets in from school at five o'clock or later, that she then has to have her evening meal, and subsequently has home lessons to prepare : Where is her time for the reading of light literature, for games, and other amusements ? Thus stated, the case seems hard, but, as a matter of fact, a considerable part of afternoon school is devoted to the lighter side of education—drawing, needlework, athletics and games, music and singing, which may very fairly be reckoned as recreation ; and it is perfectly certain that young girls are far better without the exciting and often demoralizing literature that they read when left to choose for themselves. There are plenty of holidays in the year, and during the holidays a mental regimen closely resembling cakes, sweets, and ale, is largely indulged in by many young girls. Far more unproductive recreation, such as novel reading and games of chance, are permitted during the holidays than is compatible with perfect moral and spiritual health.

The rule as to sleep ought to be enforced not only in every private house, but also in our schools. One of the gravest blots on the existing arrangements in boarding schools for both boys and girls is the absolute disregard of the necessity for sleep during adolescent years. In our large towns and in our country lanes quite small children and adolescent boys and girls may be seen dancing, singing, or wandering about up to ten and even eleven p.m. ; there is no wonder that they go to school half asleep, and too much exhausted both in mind and body to profit by their education.

Exercise.—The conscience of the nation is far better instructed now than it was fifty years ago, but even so, wealthy England lags behind the poorer Scandinavian nations in the provision of regular exercises and organized games for all classes of the community. Adolescent girls need these health-giving exercises as much as do the boys, but a certain amount of wisdom and care must be exercised lest that which ought to be an unmixed blessing should, in some instances, become deleterious. In every large class of young girls there will be those who ought to sit

down and watch their companions for two or three days at a time. In every young girl's life there are days when she feels less than her best self, and when exertion is, to say the least of it, unwise and disagreeable. A wise gymnastic instructor, and a careful games mistress will know by instinct which are the girls who need this special care, and it ought to be thoroughly understood by the class that it must be expected that every pupil in her turn will have to forego the drill and the games.

While on this subject it might be well to remark that although the Swedish system of gymnastic exercise is, as far as we are able to judge, by far the most rational, the most perfect, and that which is likely to train every muscle and every nerve in the body in the most admirable manner, the carriage of girls whose only exercise consists of gymnastics develops a certain stiffness and angularity. To obviate this there should be a large admixture of games and dances, accompanied when possible with music and singing. Swedish gymnastics cannot be done to music, but many games and dances can, and this secures the introduction of a most valuable element into the training of young girls. There is a subtle influence both in the poetry of movement as exemplified in dances, and in the poetry of sound as displayed in music, as Wordsworth said :

> "And beauty born of murmuring sound shall pass into her face."

The Swedish exercises, with their wonderful precision, order, and development of obedience to the word of command, tend to cultivate in the girls' minds as well as in their bodies certain necessary characteristics, but this sterner side of tuition needs to be accompanied by the more graceful, poetical, and spontaneous teaching of music and dancing.

The next class of exercises to be strongly recommended for adolescent girls comprises various forms of team games, such as hockey, cricket, and basket or net ball. One great advantage of these games is that not only does their success depend on the prompt and cheerful obedience rendered by the players to their captain, but that they favour the growth of *esprit de corps* and unselfishness. Each member of a team feels that the welfare of the whole depends in a great measure on her, and she learns to subordinate her individual interest to the advantage of her side. These games must, however, be played under the careful supervision of a really capable mistress, who is herself an enthusiast and an adept. Like all other valuable methods of training, there is need for real care, lest ambition and selfishness should creep in and spoil the effect for which one hopes. A short time ago much harm

was done by matches between schools or counties. This stimulated an undesirable and unhealthy form of rivalry, and too often led to physical and moral injury. There is an essential difference between boys and girls in their outlook both on lessons and on games. The boy is far more content to do his best and to be satisfied with it, whereas the girl too frequently not only wants to do her best but has a very strong desire to excel her companions. It has often been found that girls have been rendered ill, and in some cases have been entirely invalided, by a too strenuous pursuit either of academic distinction or of schoolgirl fame as an athlete. The evil is now recognized, at any rate in some quarters, and will no doubt be efficiently guarded against in the near future; tournaments and interscholastic games will be reserved for very rare occasions, whereas what may be known as "practice" games are becoming increasingly popular. Amongst the other evils of the interscholastic matches must be reckoned the extra fatigue and inconvenience caused by the necessary journeys, and the fact that the visiting team not infrequently is unable to obtain a bath or even a wash down and a sufficient change of clothing. In all strenuous games these precautions are necessary.

It is unfortunate that up to the present girls have not been able to participate in any large degree in the admirable movement that has done so much for the training of the young boys as Boy Scouts. The influence of this movement appears to be wholly good. The simple threefold promise of implicit obedience, of work, and of love, does much to secure a good moral tone in the members of the corps, while the careful training that they receive in observation, in precision of movement, and in brotherliness, is admirable. It is to be hoped that in the immediate future a similar training may be provided for girls. They, too, should be bound by the simple promise of obedience, purity, and love; they, too, can be trained in habits of observation, their muscular systems can be developed by suitable exercises, and perhaps in place of some of the more evidently boyish occupations, they could be taught the elements of simple cookery, washing, and first-aid, such as would fit them to be very useful comrades of their brothers.

During the holiday time it is particularly sad to see the swarms of girls sitting on the doorsteps or loitering about the streets while their young brothers are happy in scouting or as cadets in a brigade, and the elder brothers have joined the Territorials, and may, if they so will, be making themselves worthy to be coadjutors of the Regular Army.

There must always be a certain amount of objection to what one may fairly call *unproductive recreations*, but this uncomplimentary description cannot be applied to exercises, team games, and beyond all, to some

modification of the scout movement or voluntary aid in one of its many forms.

Swimming is another exercise particularly useful both in its immediate effects in developing the muscles and improving the health, and also in its more remote effects. Girls can swim just as easily as boys, and there would be far fewer fatal accidents from bathing and boating in the summer holidays if boys and girls alike were taught an exercise which seems peculiarly suitable to the children of an island people.

Dress.—The object of dress is twofold : to afford a decent covering for the body and to protect it from extremes of heat and cold. Practically in too many instances these fundamental objects are lost sight of and dress is considered chiefly from the point of view of an adornment. Sumptuary laws, much preaching and exhortation, have always failed to secure reason and good taste in the matter of dress, and probably at few periods of the world's history has dress fulfilled its twofold object less adequately than it does at present.

A good example set by those whom the girls admire and wish to imitate will help most, and this influence should be helped by a practical knowledge of elementary physiology and hygiene.

Among the chief sins of the adolescent girls in the matter of dress are the love, not only of the corset, but of the very tight corset, the addiction to tight belts and excessively high-heeled shoes. Every one of these fashions is deleterious. The tight corset constricts the lower ribs, displaces the viscera, and gradually alters the balance of the body, the hips being thrust backwards and the shoulders too far forwards; hence much dyspepsia, with its attendant constipation, palpitation, precordial distress, and giddiness. The high-heeled shoes not only render the wearer liable to accidents, but also entirely destroy the natural poise of the body, and gradually induce deformity of the feet. The elder adolescent girls are also at the present time disposed to dispense with the really necessary undergarments in order to cultivate what they consider an elegant and sylph-like figure, and, indeed, it it difficult to understand how much can be worn under their exceedingly skimpy frocks !

Such, then, is the adolescent girl, a bewildering mixture of the bright, the beautiful, the heroic, the difficult, the elusive, and the incoherent. The problem for parents and for teachers is, how are we to emphasize and develop all that is desirable, and how are we to eliminate, or at any rate to repress, the less desirable side of the girl's nature ? One thing we have to remember is, that although there is a sad lack of balance, and although our patience, tact, and wisdom are likely to

be taxed to the uttermost, yet the reward is great and the possibilities are great. The very characteristics that try us most are really the *défauts de ses qualités*, the over-exuberance, it may be, of the very instincts which, if guided aright, will, after a few short years, make our tiresome adolescent the "perfect woman nobly planned." The loud-voiced hoydenish girl whose gestures and words appear to us a mixture of rudeness and vulgarity, is really displaying to us the vitality and high spirits that, under wise guidance, will enable her to play her part well in future life. The plant is not to be uprooted, it is to be pruned and to be trained; we ought not to wish to destroy the girl's characteristics, but to help her to gradually develop them beyond the stage in which they are offensive, and to assist her to attain her full development. One should have far better hopes of a really tiresome girl full of character with generous impulses and inconveniently decided opinions, than of some too well-behaved and inadequate miss, in whose nature there is not stuff enough to make a woman.

ALFRED BINET (1857–1911).

By Prof. Ed. Claparède.

Translated from the "Archives de Psychologie" *by the kind permission of the Editor and Author, Prof. Ed. Claparède, by* Mary Louch.

James first, then Binet!

There could be no greater trial for psychology than this fresh loss. Alfred Binet died in Paris on October 18, 1911, from the effects of apoplexy. He had been suffering of late from fatigue, which was attributed to overwork, a diagnosis suggested quite naturally by his indefatigable activity. But the trouble, alas! was more deeply seated, and it was with real grief that psychologists throughout the world heard of the cruel event which deprives them of a colleague and master, universally loved and respected.

Binet was, without doubt, one of the most eminent of contemporary psychologists. The service he rendered to our science is inestimable. As a writer of talent, perfectly clear in thought and utterance, and endowed with a mind of a severely scientific type, he gained the esteem both of the public at large, whom he initiated into the problems of empirical psychology, and of specialists whom he furnished with a

quantity of new points of view. His mind was the most inquiring, the most observing, the most subtle imaginable, a true researcher. When investigating he showed astonishing ingenuity in catching in the act the thinking mind, the passing thought, or the most subtle processes of mental activity.

But ingenuity must not here be taken to mean complexity. Although Binet instituted the first French psychological laboratory, and invented some apparatus, it was not in experiment requiring apparatus that he made his reputation. The finest and most fertile of his researches were carried on outside the laboratory, and for all of us he will ever be the clever experimenter who used hardly any apparatus beyond "a pen, a piece of paper, and much patience." (*Cf.* Binet, *L'étude expérimentale de l'intelligence*, p. 9. Paris, 1903.)

And yet he was in truth an experimenter. No one had the experimental sense in a greater degree, nor showed more devotion to the experimental method, that is, to the truths that facts reveal, as opposed to random, preconceived affirmations. He tried to cultivate around him, especially in pedagogic centres, respect for impartial and disinterested control of affirmations circulated. Thus he rendered signal service. And still more by example than by words he brought out this principle—that in science there is no such thing as a *chose jugée*. We constantly find him, to the detriment of his previous publications, reconsidering certain experiments, modifying his formulæ, correcting and improving them (*e.g.* the successive improvements to his scale of intelligence). He was always ready to give up a conclusion if it could be shown to be insufficiently proved. He was scientific loyalty incarnate.

Alfred Binet was born at Nice, July 11, 1857. We find him quite early in life, when his study of law had hardly come to an end, turning towards experimental psychology, that still new science which M. Ribot's earliest works had just revealed to a French public. In 1880, Binet publishes in the *Revue Philosophique* a study, *De la fusion des sensations semblables* ("On the fusion of similar Sensations"), in which he tries to explain the fusion of impressions produced by the points of Weber's compass. In 1883, he publishes also in the *Revue Philosophique*, some thoughts on the reasoning involved in perception, which he collected later in a little volume entitled, *La Psychologie du raisonnement* (Paris, 1886).

At this time Charcot's teaching was at its height. The inquiring mind of Binet could not fail to be attracted to La Salpêtrière. Our young psychologist found his way into it, made his observations, and soon began to experiment on hysterical and hypnotic subjects. A

great many notes by Binet date from these years (on *hallucinations*, *Rev. Phil.* 1884; on *hypnotism*, the *intensity of mental images*, *responsibility*, etc.). These researches, carried out with the collaboration of his friend Féré, are collected in the two works, *Le magnétisme animal* (1886), and *Les altérations de la personnalité* (1892), which are epoch-making in the history of hypnotism. At the same time he was interesting himself in very different subjects, in the *psychic life of micro-organisms* (1887), and *in fetishism in love* (same date). These studies, together with others, have been published together in one volume (Paris, 1891).

In 1889 Binet and Professor Beaunis founded the Psychological Laboratory of the Sorbonne. In 1894 he became the director of this laboratory after having written his thesis for the degree of D.Sc. This thesis, entitled *Contribution à l'étude du système nerveux sous-intestinal des insectes*, had been prepared in the laboratory of Balbiani, whose son-in-law Binet had become; it is much more anatomical and histological than physiological, or, above all, psychological, and it shows the extraordinary aptitude which Binet possessed of being profoundly interested in work of different kinds at the same time. The same year he wrote a short *Introduction à la psychologie expérimentale*, which has preserved its interest to the present day.

From the time that Binet accepted this position at the Sorbonne the more important of his works appeared, the greater part published regularly from 1895 in the *Année Psychologique*, which immediately took its place among first-class periodicals. In the first volume of the *Année*, we find Binet attacking a new problem, that of *literary creation*, which he began by making a personal analysis, based on interrogation, of a certain number of dramatic authors (Sardou, Dumas, Daudet, de Curel, etc.). In the next volume he lays the foundations of *individual psychology*, and shows its wide range. Already before this he had penetrated, with his usual ingenuity, the mental secrets of calculating prodigies and chess players, *Psychologie des grands calculateurs et des Joueurs d'échecs* (Paris, 1895), and had interested himself in coloured audition (*Rev. des Deux-Mondes*, October 1, 1892). The third volume of the *Année* contains the well-known experiment on *description of an object*, and the fourth contains the first experiments on *suggestibility*, which were destined to develop later, and to be the subject of the book, *Suggestibility* (Paris, 1900).

At the same time Binet was carrying on a research in child-psychology, the origin of which is easy to guess. Having become the father of two little girls, he quite naturally interested himself in the development of these two little beings who were growing up at his

side, and from 1890 we find him publishing in the *Revue Philosophique*, the results of different experiments on *the movements of some young children*, on *perception of length and number in some little children*, on *percepts of children.* In 1894 he undertook an *inquiry into the character of children*, and studied the *visual memory* and *suggestibility* of children. In 1895 he experimented on the *measurement of visual illusions in children* (*Rev. phil.*). It is well known that this interest in child-psychology and its application to pedagogy went on increasing to the end of his life. In 1894 he conceived the brilliant idea of going into schools in order to carry out collective experiments in them, and thus "save time." Binet was fortunate in being assisted by intelligent school-teachers, and his observations accumulated in extraordinary fashion: observations on *the memory of words and sentences* (*An. ps.* i.), on *children's fears* (*An. ps.* ii.), on *muscular strength*, *fatigue*, *breathing*, in young boys (numerous reseaches made in collaboration with Vaschide which fill the fourth volume of the "Année"); on the *influence of intellectual work on the consumption of bread* (*An. ps.* v.); see also *La psychologie à l'école primaire* (*An. ps.* iv.), etc. The end Binet especially had in view in his research was to discover tests which would make possible the diagnosis of intelligence, or the establishment of certain groups or families of minds. Later, giving up physical tests which he had carried to their extreme limit, he turned his attention to mental tests. In 1901 he tried to determine different types (observational, imaginative, interpretative, simple, etc.), according to the way in which the subject behaved in regard to experiments with Weber's compass.

This is the place to mention the fine monument which Binet raised to the individual psychology of intelligence as well as to the psychology of thought, *L'étude expérimentale de l'intelligence* (Paris, 1903). This book, the aim of which is to study the personal factor in ideation, sets forth the experiments made by Binet during a period of three years on his two little girls at that time aged respectively thirteen, and fourteen and a half years. He showed that while one, Marguerite, was a fine specimen of the observational type, the other, Armande, represented the imaginative type, and he tried to find out by what other mental characteristics this difference between the two sisters revealed itself. By means of a fine analysis, made with their intelligent collaboration, Marguerite and Armande are well known to all psychologists. At this moment the two sisters are mourning: our thoughts have been with them in the trial which has befallen them.

Alfred Binet's name will always be associated with those of the creators of experimental pedagogy. In the preface to *La fatigue intellectuelle* (Paris, 1898), which was written in collaboration with

V. Henri, he condemns in severe terms (perhaps rather too severe, but nevertheless just) old-fashioned pedagogy, and especially the method, or rather the absence of method, of traditional pedagogy. One can trace all the work accomplished by Binet from this time onward, by reading his recent book, *Les idées modernes sur les enfants* (Paris, 1909), which is hardly anything else, but that is much, than a *résumé* and a co-ordination of his own works.

In 1900, Binet created, together with F. Buisson and Madame Kergomard, the venerable lady-inspector of the *écoles maternelles* in Paris, and our lamented friend, Marillier, and yet others—the *Société libre pour l'étude psychologique de l'enfant*—a strong association with affiliated societies in various towns in France, of which Binet was so intrinsically the soul, that one asks one's self whether his death will not put an end to it. But Binet gave it an impetus which will survive him; the seed he has shown has already sprung up, and we are certain that this splendid work will not be endangered in the hands of such men as Malapert, Belot, and, above all, Monsieur Vaney, the sympathetic director of the primary school in Grange-aux-Belles Street. It was in this school that Binet founded, in 1905, a small school-laboratory for normal pedagogy; from this laboratory have emanated some important observations on the *sight of schoolchildren*, the *measurement of auditory acuteness*, the *effect of the attitude of a child at its desk on the amplitude of respiration*, etc.; these observations were published in the *Bulletin* of the *Société libre*, which has come out regularly since 1900.

We have now come to the time when the question of abnormal children began to attract attention in France. While Germany, Belgium, and Switzerland had for a long time arranged special instruction for children of this kind, nothing had been provided for them in French school organization. In 1902 the *Société libre* recommended a medico-pedagogic inquiry in schools. But it was only in 1904 that the Minister of Public Instruction appointed a commission composed of medical men, educators, and scientists to inquire into the matter. Binet was invited to take part in the commission, and he became one of its reporters. From that time he devoted himself entirely to the solution of the new problem which had been presented to him. He perceived at the outset the enormous difficulty of the problem, but the very difficulty stimulated his ingenuity. From the first he was struck by the vagueness of the terminology relating to the abnormal, which confused and sterilized the discussions of the commission. For all these inexactitudes, for the medical classifications so ill-adapted to the pedagogical end in view, Binet hoped to substitute a scientific criterion of backwardness, the only way of doing serious work.

At the same time I was myself occupied in gathering statistics relating to abnormal scholars in Geneva, in view of the reorganization of their instruction. Binet frequently wrote to me to tell me of his results, and to ask me for mine. I extract from one of his letters, dated March 14, 1905, the following lines, in which allusion is made to the work of his commission:

"We are asking ourselves of what use these school-asylums will be to idiots and imbeciles. They are what the bottle is to the ink. There is no agreement about definitions. Also the doctors will not say what the children are that they receive, and one does not know scientifically to what extent they are benefited. I meet with opposition of all kinds. I am at work on the precise definition of degrees of degeneration, and also I have begun a study of one hundred abnormal children from the school. I am overwhelmed with work. I would that the distinction between the normal and abnormal were known, defined exactly, so that confusion (hooking-on) might be avoided. How far have you got? It takes long to write one's thoughts; it would be better to talk."

This fragment of a letter clearly shows with what ardour Binet entered into the questions he took up. As a member of the commission, he deeply felt the responsibility he had assumed, and he had eyes for nothing but the problem which had to be solved. But what is this "opposition of all kinds" to which he makes discreet allusion? It is perhaps not difficult to guess. It had to do, no doubt, with the opposition of doctors who were not satisfied to see a psychologist, a stranger to their caste, trying to discover methods of diagnosis which were not included in the usual criteria for treating mental diseases. In these days such opposition would no longer be understood, so much has the matter progressed during the last six years. Do we not everywhere see the medical profession getting hold of the tests of physchologists in order to deal with mental phenomena? Other difficulties, doubtless, arose from the number of arrivals in the field, who crowd in from all directions as soon as some new question becomes the subject of official inquiry, and who, hoping to derive some profit for themselves, are not very well pleased to see one who is a stranger to their set in the act of solving the question. Binet was the sworn enemy of these incompetent self-seekers. What a nice little picture he has left us of them!—

"Since the problem of abnormal schools has arisen, many kinds of ambition are in evidence around us. Interests, frankly personal, hide under a mask of philanthropy, and he who dreams of making a nice position for himself in the schools for abnormal children never speaks

of them without tears in his voice. These are the eternal comedies of human life; there is no need to get indignant with them. Every one in life has a right to consider his own interest, if, in considering them, he does not compromise interests superior to his own, namely those of the community. It is this general interest which is pre-occupying us . . ." (Binet, *Les enfants anormaux*, p. 15. Paris, 1907).

In order to facilitate the work of the commission, Binet published his first researches, carried on with the assistance of Dr. Simon, on the *Metrical scale of intelligence* (*An. ps.* xi., 1905). These researches were completed and perfected later (*An. ps.* xiv. and xvii.) and resumed in his book *Les enfants anormaux* (Paris, 1907), which has become the breviary of those engaged in "special" teaching. This scale of intelligence, so happy in its simplicity, will remain one of the claims of Binet to the gratitude of pedagogues. It has given rise to a quantity of analogous inquiries, and most authors, as, for example, Decroly and Degand in Belgium (*Archives de Psychologie*, vi. and ix.), Goddard in America, Mlle. Descoeudres in Geneva (who in the current number of the *Archives de Psychologie* has given an account of her experiments, dedicated to the memory of Binet), have all testified to the general value of the scale of Binet and Simon.

This measurement of intelligence naturally led Binet to ask himself a number of questions as to the nature of the process which distinguishes one mental level from a preceding one in the hierarchy of function. And so we find Binet in the latter years of his life launching into mental pathology. He thought, and rightly thought, that the psychogenic method (which consists in arranging in a series a certain number of backward children according to the development of their intelligence, in order to see how one particular phenomenon acts throughout the series—for example, grief or attention) would permit of perception of the stages which a phenomenon presents, and of its process of evolution. It may well be imagined that Binet did not expect to solve this problem by shutting himself up in his study: he frequently visited the asylum at Rouen, of which Dr. Simon is the physician. The important and ingenious observations which may have been made during these visits are to be found in the three last volumes of the *Année*. They teem with new perceptions, and promised still more results than have been up to the present achieved. Binet was working at this renovation of psychiatry when death removed him.

(*To be continued.*)

SUGGESTIONS FOR PARENTS AND TEACHERS.

The Cultivation of Respect.—"A due regard to a respectful attitude is often wanting before the little child, and this negligence has all the more influence upon him as he tends to be brought more into contact with older persons. He is apt to hear his friends, regardless of his presence, talking together without thought, criticising or reproaching one another, sometimes even displaying their disagreement on the subject of his proper treatment. Thus more or less consciously he concludes that his friends are not free from fault, and, more than this, he acquires the habit of speaking to them as he has heard them speak among themselves.

"Often, too, his parents do not expect enough from him; they put him on an equality with themselves, one would almost say on a superior footing, obeying his wishes, even indeed his orders, and rarely demanding obedience from him. As a result the child not only acquires bad manners, but also an exaggerated feeling of his own importance, and a false idea of his relation towards his elders. Further, those who have charge of the education of the child are sometimes criticised in his presence, even at times ridiculed, whilst relations and friends are discussed, not so as to call attention to their good qualities, but too often in such a way as to bring to light their faults, and national institutions and officers of the state are made light of."—*Bulletin de l'Education morale de la Jeunesse*, Groupe de Rouen, December, 1911.

The Order of Speech Development.—"It is not without interest to determine in what order the words belonging to the different parts of speech are retained in the verbal memory of the child, and thus, what lines of words he learns most easily and quickly. All observers agree that nouns are the first words to hold a place in his vocabulary and to dominate it. The little one, whose intelligence is at first only a succession of perceptions and intuitions, tends in the first place to mark off by their names the things he is shown and which interest him. Verbs, which express an action or a feeling, come after the nouns. Adjectives, likewise, except those which designate sterling qualities or are descriptive of bodily feeling, as white, black, hot, cold, come only into the third rank. Later still are the pronouns, even the personal pronoun I; we know how reluctant the child is to use it, and how long he takes to drop the habit of speaking of himself by his own name. Lastly come the adverbs—except those which show situation, as above, below, and which are among the first—and conjunctions and prepositions. Thus, progress in language follows closely the evolution of intelligence, which, at first

imprisoned in sensations, raises itself by degrees to reasoning and the conception of relations."—*Dr. G. Compayré*, in *L'Educateur Moderne*, December, 1911.

Formal Training.—"By 'formal training' I understand the influence of practice and improvement obtained in one mental function producing improvement without special practice in another mental function" . . . [Psychologists] "believe that spread of practice occurs only where identical elements are concerned in the influencing and influenced functions . . . What then are these common elements? . . . We may, I think, refer them to three broad heads: (1) Certain specific habits and movements may be common to many different processes. For instance, control of hand, control of voice, control of eye—these are the products of special training, and enter into many different activities. (2) Certain specific ideas and memories may be useful for many different processes. The idea of logical reasoning, the memory of certain schemes or methods of argument or manipulation—these, again, may be acquired through education, and exploited upon subjects widely different in their nature. (3) We must not forget the affection or emotional aspect. In developing what we call 'interests,' and in inculcating what we call 'motives,' the training of the emotional element, the development of moods and attitudes as reactions to certain classes of objects, is perhaps the most essential part of the process of education. . . . The commonest elements are not habits that occur from practice, or faculties that can be developed like muscles, but ideas and methods that come from experience. The practical corollary seems to be this: emphasize and extend, not the elements peculiar to and characteristic of school and school conditions. Emphasize and extend the elements shared by the curriculum and the conditions of school in common with the conditions and requirements of life"—*Cyril Burt, M.A.*, on "Experimental Investigations of Formal Training" in *School Hygiene*, February, 1912.

Dangers in Choosing a Trade.—"You must be on your guard against the common error which mistakes the effects of environment for the ardour of genius, or imagines there is a decided bent towards any one of the arts, when there is nothing more than that spirit of emulation, common to men and monkeys, which impels them instinctively to do what they see others doing, without knowing why. The world is full of artisans, and still fuller of artists, who have no native gift for their calling, into which they were driven in early childhood, either through the conventional ideas of other people, or because those about them were deceived by an appearance of zeal, which would have led them to take to any other art they saw practised. One hears a drum and

fancies he is a general; another sees a building and wants to be an architect. Every one is drawn towards the trade he sees before him if he thinks it is held in honour. . . . There is all the difference in the world between a liking and an aptitude. To make sure of real genius or real taste in a child calls for more accurate observation than is generally suspected, for the child displays his wishes not his capacity, and we judge by the former instead of considering the latter. I wish some trustworthy person would give us a treatise on the art of child-study. This art is well worth studying, but neither parents nor teachers have mastered its elements" [in 1762]—"Emile," translation by *Miss Barbara Foxley, M.A.*

NOTES.

Our Annual Conference.—Members of the Societies are asked to take particular note of the programme of information, concerning the meetings on May 9, 10 and 11, which is sent with each copy of this number. The circular is quite separate, so that it can be easily kept for reference, and taken to the conference and used as a programme there.

It is important that the form on p. 4 should be filled in and returned to the Hon. Sec. of the London Society. This will greatly assist those responsible for making all arrangements with our hosts, etc., and may prevent considerable inconvenience being caused to them. The issue of this number has been delayed to include the programme.

As it has been decided that the papers shall be printed, and be accessible to those attending the conference beforehand, they will be taken as read at the meetings, and the time given to discussion. The writers of the papers will be allowed twenty minutes to give any further points or comments, and so introduce the discussions. To make this procedure of the greatest possible value to those present—which is the reason for its adoption—members must freely join in the discussions, and fill in the form on p. 4 to this effect.

Owing to the coal strike it will probably be impossible to arrange for cheap fares, and those coming from a distance must act accordingly.

Our Library Catalogue.—This has been brought up to date for March, 1912, and is issued as a separate pamphlet. Every member of the Societies will receive a free copy, by virtue of the capitation fee paid on his behalf. The copies go to the various societies with this number of the Journal. Each member should see that he gets his copy, as there are many valuable books in the library, and these may be loaned by members, on the terms set forth in the catalogue.

Combined Annual Reports.—The Council has decided that an endeavour shall be made to issue annually the reports of all the Societies in pamphlet form. It is believed that this will be of considerable value in giving suggestions to the individual societies, through their thus knowing what others are doing, and how they are doing it; and also that such pamphlets will be of very great use for distribution for propaganda purposes. They will be produced at the cheapest possible rate. Only by the consent and cordial co-operation of the different constituent societies, however, will the issue of such a pamphlet be possible.

A Conference on Diet in Schools.—The National Food Reform Association has organized, through a very widely representative special committee, a conference on diet in public secondary and private schools. It will be held in London on Monday, May 13, in the Guildhall, and the Lord Mayor (Sir Thomas Crosby, M.D.) will preside. Papers will be read on the following topics: "Diet as a factor in Physical, Intellectual, and Moral Efficiency," "Existing Methods," "The Main Lines of Reform," "Instruction in the Elements of Physiology and Personal Hygiene," "Problems in Institutional Feeding," "Training in Institutional Management."

It is proposed to call a further conference to consider the feeding of elementary schoolchildren and those in charitable institutions. Further information as to membership, etc., can be obtained from the Secretary, National Food Reform Association, 178, St. Stephen's House, Westminster, S.W.

The Parents' National Education Union.—This Union is holding a Children's Gathering at the Guildhall, Winchester, on May 6, 7, 8, and 9. An exceptionally interesting series of meetings, lessons, excursions, etc., have been arranged. Further information can be had from Miss Parish, P.N.E.U. Office, 26, Victoria Street, London, S.W.

International Moral Education Congress.—The second congress will be held at The Hague, August 22 to 27, 1912—the first was held in London in September, 1908. Papers will be read by representative people from most of the European countries, Australia, Egypt, India, and the United States. We notice that Mrs. Mumford (Manchester) and Dr. Hayward (London), of the Child-Study Society, are contributing papers. Full particulars about the conference can be obtained from Mr. Fred Charles, 22, Park Crescent, Church End, Finchley, London, N.

CORRESPONDENCE.—Co-Education.

Sir,—The question of co-education has scarcely yet left the stage of general discussion, of mere expression of personal opinion. The weight of a personal opinion depends on the person, but, in any case, it is not universally, equally, and permanently convincing in the same way as is a body of hard facts. We state our impressions, our inclinations, our "moral certainties," our personal preferences; these do not form conclusive evidence, since an equal array of opposed impressions, opinions, and preferences may be brought against them.

To get beyond this stage we must proceed along more scientific lines; we must stiffen our arguments with facts, demonstrable and provable facts. It is true that we may not hope to express the best results of co-education in this way—those results that are most subtle and far-reaching in building character and developing personality. Such claims must, perhaps, for a time at least, be still supported by personal opinion based on facts of long experience. Facts of observation, results of experiment, statistics are wanted. They convince by the weight of accumulation. The collection and careful arrangement of general and special data may provide some ground for drawing definite conclusions which will stand repeated assault and may come to be accepted as recognised truths.

The arguments of convenience and economy in small schools are of great weight in particular and specific cases, but in discussing the advantages of co-education as such they must be left aside.

In physical education the advantages of mixed education may seem to be smallest. But as physical development is at the foundation of personality and character, so this

side of co-education gives boys and girls some of the most important experiences of each other's capacities and characteristics. The game is not always to the swift and the strong. Moreover, women, rightly or wrongly, claim to meet men on level ground, on equal terms, and yet under differing natural conditions, of which not the least obvious and important are physical. The co-education playing-field provides four or five years' experience on this question which must be of the highest value in later years. The defeat of the VI. form boys by the girls in a recent netball match had moral and social values such as no class-room lesson could have provided.

In intellectual work the traditional disadvantages of girls have not shown themselves. Science and mathematics taught by men have been as enthusiastically and successfully pursued by the girls as by the boys. The teaching of history, languages, and literature by women has revealed no special superiority in boys or girls. More than half the successful candidates at matriculation have been girls with an average age below 16 years. It is highly probable that girls have the advantage over boys during the ages 12–15 years.

When curricula are prepared with much more general relation to the interest and demands of life than is now commonly the case there would perhaps be less objection to joint studies. If concessions are made in chemistry to domestic interests, there are many reasons why boys should experience the same facts of life here as girls. Girls, too, may be just as reasonably interested in the application of physics to heating, ventilating, electric lighting as boys.

The moral and social values of co-education are obvious to the teacher, and still live in the memory of some of us. Prof. Davis, of Minnesota, writes: "There can be little doubt that in elementary classes the fact that inexact, sluggish-minded youths are obliged to see their dulness exhibited daily before keen, precise young women is a vast incentive to those youths to do their best." Is it not possible that the free and easy, untroubled attitude of the boys may have its steadying .effect upon the tense concentration and feverish application so often shown by the girls? Statistics are wanted here, too. Girls ought to be taught in part by men, and boys by women. But a class of girls only, taught by a vigorous man, would sadly miss the brake of the average boy. It is obvious that boys and girls have much unconscious influence upon one another. As a result there is truer esteem of capacity and place, and a higher appreciation on both sides which is serving to dispel many dangerous and deep-seated prejudices.

Boys and girls thrown into intimate relations before the age of, say, 13 years will behave sanely and normally throughout their school course. The same cannot always be said of boys and girls attending neighbouring schools.

The moral and social gains depend partly upon the clearer understanding and truer knowledge gained by both sexes during years of daily and intimate contact. Better and generally greater appreciation follows on both sides, and thus the foundation of future relations is more fairly laid. But this is not the end of such gains in co-education. Social education is very limited in a boys' or girls' school, because the half of a society is absent, consequently joint activities are impossible. Not only must some branches of school work suffer, especially the artistic side of culture, such as music, and to a less extent art, but many interests outside the class-room are uncultivated.

H. E. PIGGOTT.

Hornsey County School, Feb. 14, 1912.

SIR,—Miss I. de C. has given us a very interesting account of her impressions of the value of co-education to herself and her girl friends. Her remarks on the keenness of the co-educated young people to leave school are particularly suggestive and set one thinking. Why are they so keen to leave school?

A. Coed seems to think the "home" resembles the mixed school in being the antithesis of separate schools. But the ideal home stands about midway between the two; for while, like the mixed school, it affords an admixture of masculine and feminine influences, like the separate school it absolutely excludes sex love (between its younger members).

If the presence of other fellows' sisters, and other girls' brothers, makes no vital difference between the mixed school and home; or if that difference is assumed to be a beneficial one, then is our discussion vain. To dub the mixed school system "natural" and to posit it as opposed to the monastic system seems like begging the question by implication. It is "natural" to return evil for evil, but is retaliation better than monastic forgiveness?

The monastic system may yet find some justification in the ever-increasing specialism of to-day. Thane expressed an opinion (*Child-Study*, p. 129) on the limitations to co-education imposed by differences of after-life, and I need only remind A. Coed that girls cannot play either of the chief games of young men, to wit cricket and football.

Having shared and conducted mixed classes in biology, hygiene and first aid, I am not prepared with the list for which A. Coed asks, but I dare say I could start such a list with the subject of "instruction in sex hygiene."

BERESFORD KINGSFORD.

REVIEWS.

L'Educateur Moderne. December, 1911. To the last issue of the year the editor, Gabriel Compayré, contributes a valuable review of some recent work, French and American, on the development of language in children, which would well repay perusal, and Dr. Saurent begins the consideration of the relations between brain growth and psychic evolution. This article should be studied if only for its clear account of brain physiology. T. G. T.

Bulletin de L'Education Morale de la Jeunesse. December, 1911. In the December issue is a thoughtful report of the Rouen group on the question of the development of the feeling of respect in children, and a brief discussion of one aspect of the problem of training children to obey, both of which are worthy of consideration. T. G. T.

The School, an Introduction to Education. By J. J. FINDLAY, M.A., Ph.D. Home University Library. Williams & Norgate. Pp. 256. 1*s.* net.

Prof. Findlay's general position appears to be as follows: Man is dependent upon schooling for his abilities to adjust himself to environment, so that his development depends upon education; and, therefore, the peculiar function of the professional teacher is to be a student of a growing organism, and to bring all the resources of science to bear upon the problems of its growth and change. "The heart of this book," he says, "is to be found in Chapter V." Chapter V. deals with "Stages of Growth (or Development)," and is, in effect, a short summary of modern views on the development of instincts. The ten chapters of the book have as titles: "Origins," "The Young Man," "The Rise of Educational Institutions," "The Function of the School," "Stages of Growth (or Development)," "The Organization of Education," "Types of School—with Some Reference to Universities," "The Teacher," "The Pursuits of the School," "The Corporate Life of the School."

The space at our disposal does not permit of detailed criticism, and we must

content ourselves by saying that the book is decidedly interesting, provocative of criticism, and encyclopædic in the issues and theories which it touches.

School Visits and Journeys, their Value and their Practice in Education. By HORACE PIGGOTT, M.A., Ph.D. J. M. Dent & Sons. Pp. vi., 96. 1*s*.

This is one of "The 'Educational Journey' Series," of which Dr. Piggott is the general editor. The standpoint is that the value of books in the real education of a child "stands to him in direct relation to his experience in life. To make this rich and round and full is one of the problems of education, as it should be an ambition of life. Educational journeys are here presented as a valuable means to this end." The subject is treated under these headings: "The Place of Personal Experience in Education," "School Journeys as a Means of Education," "Visits and Journeys—Some Characteristics and Differences," "Organization," "Preparation in School," "The Journey—and After," "Ultimate Values of School Journeys." There is an appendix giving the contents of the various books in the series.

This is an excellent little book, and can be strongly recommended to all teachers. It sets forth the educational principles clearly, and gives first-rate practical advice for carrying out journeys.

La Revue Psychologie. September, 1911. Misch & Thron, Brussels. 10 fr. per ann.

In this issue appear the opening discourses of the Congress on Paidology held last year in Brussels, the volumes of reports of which have not yet been issued to subscribers. From the same congress comes an article on "The Moral Influence of Llöyd," very appreciative of the method and of its founder, and detailing how, under the personal observation of the writer, children had been influenced for good by their work. To this issue also Prof. Bachterew of St. Petersburg gives a thoughtful discourse on "Social Psychology," urging that many earlier writers, as Tarde and Lebon, have approached the subject from too subjective a standpoint; that even Wundt, in his "Volkerpsychologie," has not reached the best point of view; and that the need is for a more objective treatment, and a closer consideration of the reaction of social groups. This article would well repay further consideration.

T. G. T.

L'Educateur Moderne. January, February, March, 1912. Paulin, Paris.

In these three issues the most notable articles, from our point of view, are those in January and March, by M. Comfayré, on "Froebel," in continuation of two in October and November. This series of four articles, a general *résumé* of Froebel's teaching, with some account of modern tendencies and developments, is well worth consideration; in France, where there has of late been a revival of interest in the kindergarten system, it is opportune. In the January issue Dr. Laurent gives a *résumé* of the proceedings at Lyons of the section on abnormal children of the French Medical Congress, the questions considered being the need of boarding schools and the value of manual occupations for abnormal children. In the same issue Mme. Moll-Weiss gives an all too brief account of visits she paid to Froebelien schools in Dresden and Berlin, and Mme. de la Chapelle a warm appreciation of what she saw at the Birley House School, Forest Hill.

M. Roger Cousinet, like may other people, has slight belief in the educational value of dictation, and deals ironically with the subject in the February issue, wherein also appears a philosophical, if not quite convincing, article on the "Child's Idea of Justice," whilst the figures provided by M. Friedel in dealing with the payment of teachers in various European countries afford some interesting comparisons, though Great Britain receives inadequate treatment.

T. G. T.

Archives de Psychologie. November, 1911. Williams & Norgate. Pp. 96. 3 fr. 25.

In the *Archives* for August, 1906, appeared a criticism of the Binet-Simon Tests of Intelligence, by Dr. Decroly and Mlle. Degand, which is still one of the standard pieces of work upon this topic; in this issue appears a less exhaustive but skilful examination of these tests in their application to twenty-four children, by Mlle. A. Descœudres. She concludes that the tests for children of 7–8 years, whilst they show clearly the difference between the good and bad pupils, are too easy, since a normal child of seven should be able to do those set for children of eight years; that the tests for 9–10 years are less characteristic, whilst those for 11–12 years, whilst marking the differences between pupils less clearly than the earlier tests, are somewhat too difficult. The same writer also gives an account of some further tests she has tried, at the suggestion of Prof. Claparède, on fourteen backward and abnormal children, with their results. Together, these two articles form a valuable contribution to an important subject. This issue also contains an appreciative review of the work of the late Alfred Binet by Prof. Claparède. T. G. T.

Bulletin de l'Education Morale de la Jeunesse. January–March, 1912. Paris: 81, rue Darean. 16–20 pp. 50 centimes.

This useful little publication, deeply interested in moral training, and of late an exponent of the methods of Mme. Montessori, contains much of interest to lovers of children. Its appeal is rather to parents than to teachers. In the January issue is a short article urging that little children should not be too carefully guarded from exerting their physical strength by over-anxious relatives; in the March number appear two contributions, one on the means of preventing children from becoming afraid of the dark, the other on school hygiene, dealing with the elements of the subject, and promising more. It is interesting to note that at the "Maison des Enfants," in the avenue du Général Tripier, a school recently opened on Montessori lines, and presided over by Mme. Prigol, a series of meetings of mothers has been arranged for the study of experimental psychology and scientific pedagogy. This is certainly a hopeful departure; may it succeed and others follow; perhaps some British mothers—not to mention fathers—might profit by a similar course.

T. G. T.

Publications Received.—*Journal of Education; Journal of Experimental Pedagogy; Educational Times; Child Life; Parents' Review; Educational Review* (U.S.A.); *The Pedagogical Seminary* (U.S.A.); *The Training School* (U.S.A.); *Archives de Psychologie; L'Education Familiale; School Hygiene; The Nature Reader*, Monthly, by F. H. Shoosmith, B.Sc.; *The Teaching of English Analysis*, by E. M. Dobbs, M.A.

Vol. 5.—No. 2. JULY, 1912.

Child-Study.

The Journal of the Child-Study Society.

MEASUREMENT IN CHILD STUDY.

By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

Being the Presidential Address to the Conference of the Child-Study Society, London, May 9, 10, *and* 11, 1912.

The wisdom of Frœbel's words: "Lasst uns unseren Kindern leben!" —"Let us live with our children"—is fully appreciated by the Child-Study Society, which has, however, advanced upon that, and realized that we must not only live with them and love them, but make them the subject of scientific observation and experiment, if we would fully discharge our obligations to them. The Society has come into existence to collect and analyze the crude and fragmentary and not always impartial records of the domestic circle, to digest the wider but still restricted experiences of the school, and to initiate such inquiries as may throw light on child-nature, and, therefore, as embryology has done, illuminate the whole history of man. It has already achieved useful results and exerted a wholesome influence on teachers and parents and on the public too, for I do not doubt that the reports of its proceedings, trickling through the press, have promoted that periodical medical examination of children in elementary schools now happily established, which I hope to see one of these days extended to schools of all classes and even to the home, for I cannot conceive any better or more economical scheme of National Life Insurance than that which secures the conservation of the health of the rising generation, and the early detection and efficient treatment of those diseases and defects which, left unheeded, help to pile up that enormous and grievous load of degeneracy of many different kinds under which this country groans and for which it has to pay. *Principiis obstat.*

Thanks, I believe, in some measure to the operations of this Society, we are slowly outgrowing the notion that the child is like a lump of clay in the potter's hand and can be moulded at pleasure. We are beginning

to understand that each child is a specific entity—a little hide-bound bundle of living possibilities, good and bad, and that if we would evoke the one and repress the other, our education and training must be individual and not in the gross. We are beginning to perceive that the phenomena of child life must be noted and arranged in their invariable relations of succession and similitude if we are to discover their scientific meaning and practical significance. We are beginning to comprehend that certain manifestations of wickedness and contrariety in the child are sometimes due to original sin in the sense of some fault of organization, not amenable to discipline or punishment, but requiring segregation, or to the effects of a temporary inroad of some ill-disposed microbes to be corrected by vaccine-therapy. We are beginning to recognize that the mother and the father and the teacher and the physician must all co-operate if the twentieth-century child is to be emancipated from crippling traditional bonds, to exchange dull drudgery for delightful spontaneity, and to attain the full stature of mind and body to which its inherited proclivities entitle it.

The investigations of the members of the Society have already covered an extensive field; the papers read before it have opened up many new lines of research, and in delivering my third address as your President, as I have the honour to do this evening, I am puzzled to find any new thing to say to you, any topic in connection with child-study, within my own ken, which has not already engaged your attention, and been discussed by experts. I trust, therefore, you will bear with me if, driven by stress of forestalment, and desiring to avoid the seductive but unremunerative regions of pure speculation, I merely point out to you certain seams of child-study still comparatively unexplored, into which new shafts may profitably be sunk, and illustrate by means of one or two examples the utility of accurate measurement, physical and psychical, during the growth of the child.

And, first, let me allude to an interesting and promising branch of child study still much in need of elucidation—that which relates to the order of development of sex differences and characteristics, mental and corporeal. From the moment of the fertilization of the germ when sex is determined, divergence in structure and function goes on until maturity is reached, and a just comprehension of the extent, progress and limits of that divergence is essential to the wise regulation of education and of social life.

The gradual mental divergence of the boy and the girl is an object of daily observation in every family circle, and in every seminary for the young, and asserts itself from time to time in salient ways. Thackeray said that little girls make love in the nursery, and practise the arts of

coquetry on the page-boy who brings the coals upstairs, and as for the page-boy, his pugnacious propensities are already fully developed and have probably brought him into conflict with his brother buttons. But notwithstanding the saliency and universality of the mental difference between boys and girls, these are still imperfectly understood, and in this, as in so many other problems of nature, the greater our knowledge grows the clearer becomes our vision of the difficulties and complexities of a final scientific explanation. The differences in mental constitution between boys and girls observed, and often very imperfectly observed, cannot be correctly interpreted from any purely psychological point of view. When that eccentric father of a family of geniuses, the Rev. Mr. Brontë, of Haworth, desiring that his children should speak freely and without timidity, put them behind a mask and interrogated them on various subjects, he was told by his son Branwell, then seven years old, in answer to one of his questions, that the best way of knowing the difference between the intellects of men and women is by considering the difference between them as to their bodies. The deliverance of the precocious boy seemed to his father at the time, a wise saying, worthy of being recorded, but it is incontestable that there are now large numbers of cultivated people to whom it must sound as foolishness, and a mere infantile echo of a barbarous prejudice, the absolute intellectual equality of the sexes, under free economical, social and political conditions, being regarded, notwithstanding some somatic differences, as as well assured as the equality in physical energy of two forty horse-power motor-cars although of different make and pattern. And yet few medical men will doubt that Master Branwell Brontë was quite right, and that it is in structural modifications and changes that the meaning of the unquestionably diverse intellectual powers and capacities of the two sexes must be sought out.

To catalogue in the briefest way the bodily differences between the male and the female which underlie their intellectual disparities would be to exhaust the time at my disposal. They are universal and intimate, and involve every organ and tissue. They extend from cuticular appendages to the marrow of the bones, from the crown of the head—for, according to Broca, the female cranium is less elevated than that of the male—to the sole of the foot—for, according to Delauncey, woman has a plantar arch flatter than that of man,—which perhaps accounts for her partiality for high-heeled boots. It is, of course, in the brain that the immediate substratum of mental sex differences must be sought, and although prolonged exploration is still necessary to explicate the stratification and cleavage of that substratum, indications are not now wanting that it is differently organized in the two sexes;

and hopes may be entertained that we shall yet be able to recognize in it histological differences in structure corresponding with the markedly different epochs of mental evolution in boys and girls.

Fleshig, observing that in the embryo the nerve fibres first formed are naked or have no myelin or insulating sheaths, and justifiably assuming that the formation of these easily detected coverings marks the completed structure of the nerve fibre, and the time of its entrance on functional activity, has shown that the different areas of the cortex of the brain come into operation at different periods of intra- and extra-uterine life. The first areas to become myelinated are the primary sense centres for smell, cutaneous and muscle sense, sight, hearing, and touch, and later, in connection with these centres, myelinization of the tracts of motor fibres is observed. There are thus formed seven primary zones in the brain, sensory and motor, called projection areas, because they are the foci of the out-going and incoming nerve fibres which connect the cortex of the brain with the underlying parts of the nervous system, and outside these primary zones are gradually developed marginal or border zones, which have no projection fibres but are connected by short linking fibres with the primary projection areas. These areas all develop after birth. We can actually see the budding of the brain and the putting forth of the binding withes, and these may together be regarded as the seat of organized memories connected with the primary sense centres.

But the projection or motor and sense areas and marginal zones in the brain occupy only a small portion of its surface; forming islands surrounded by much more extensive and still almost unexplored tracts. These are the association centres in which all the higher and more complex mental activities are mediated, the regions in which the different sense impressions are synthesized, into complex perceptions or concepts. These association centres are connected by bands of nerve-fibres, with the various sensory centres into which are gathered up all the impressions poured in through the avenues of the senses, and thus the mechanism is provided by which the impressions from these separate sense centres may be sorted and combined in consciousness to form a mental image of a complex kind. In these association centres the orderly sequence of phenomena in the external world is reflected in an orderly way, and records of past experiences are laid down and classified and made reproducible by some as yet unknown change in galaxies of cells and networks of fibres.

In these association areas, four in number, changes in structure and function in the direction of evolution proceed until maturity is reached and dissolution sets in. No doubt in the sensory and motor centres

elaboration of structure and improvement of function, go on long after the myelinization of the fibres connected with them is complete, for the highest acuity of the several senses and the highest voluntary control over the muscles are only gradually acquired during infancy and childhood, but it is in the association centres that educability is retained until middle life, if not later. The efficiency of their performance in some directions may be increased by exercise and training even during senescence, but the power of exercise and training at all ages is strictly limited by the inborn character of the organization, and by certain laws of growth. The cells of the cerebrum have their individual heredity, and can only be influenced within a narrow range by the environment, which sense impression, exercise and training and the blood provide for them, and there is probably localization of function within the association centres, as well as in the brain as a whole. And part of the inexorable heredity of the cells of these association centres, in which the highest mental processes are mediated, is a sex habit which no exercise or training can obviate, and which is also probably reflected in differences in localization within the association areas in the male and female respectively. Every organ in the body is represented in the brain, and it is impossible to doubt that the representation is just and proportionate, and that the congeries of cerebral centres above repeats every distinctive feature and function in the congeries of bodily organs below. Knowing as we do that different parts of the cerebral cortex give different reactions in consciousness, we are satisfied that special talents in individuals are due to differences in organization of special parts of the cortex, and *à fortiori* it would seem that the broad mental differences between men and women must have differences in cerebral organization underlying them. What these differences in cerebral organizations are we do not fully know, for, apart from a guess founded on size, no anatomist could say positively whether a brain submitted to him was male or female, but it may be hoped that in time these differences—differences, perhaps, in convolutional arrangement and cortical lamination in different regions—will be made out, and it is, perhaps, in the close observation of the emergence of the mental differences of sex in connection with cerebral development that a clue to their localization may be obtained, and a trustworthy scheme prepared of the distribution of the higher psychical activities in the cerebral cortex. The order of appearance of sexual mental differences and the age periods at which they present themselves are questions of great practical importance, for it is during its nascent or growth period that every cerebral centre is most amenable to discipline and most powerfully influenced by exercise and training.

There is one well-established physiological difference between men and women that must not be lost sight of in connection with cerebral activity, and that is the composition of the blood. The fact may not, perhaps, be palatable to some uncompromising advocates of women's rights, but it is a fact that there is a marked difference in the blood of the two sexes. The red corpuscles of the blood whose function, speaking generally, is to carry oxygen from the lungs to the tissues, average in number 5,000,000 per cubic micro-millimetre of blood in the adult male, and 4,500,000 per cubic micro-millimetre in the adult female. The blood of the adult male is, therefore, ten per cent. richer in red blood corpuscles than the blood of the adult female. The number of these red corpuscles of the blood no doubt varies greatly under different conditions. It varies in individuals, with states of nutrition and modes of life, and even with the time of day, showing a distinct diminution after meals: it varies in pathological states, being reduced to an extreme degree in anæmia; and it varies in accordance with geographical position, being sometimes increased in those who live at very high altitudes (10,000 feet) from 5 up to 7 or even 8 million per cubic micro-millimetre. The reaction under these circumstances begins very quickly, within twenty-four hours according to some observers, and even in less time according to others who have experimented in balloon ascents, but in whatever time established, it is clearly an adaptation by which, by means of an increased number of corpuscles, the oxygen carrying capacity of the blood is raised to compensate for the diminished amount of oxygen in the air. We shall await with curiosity blood counts in the case of our adventurous aviators.

But all the variations in the number of the blood corpuscles, that take place under varying conditions, only emphasize the importance of the part they play as the carriers of that hæmoglobin which combines with the oxygen of the air in the lungs to form oxyhæmoglobin, from which the tissues, and the brain tissues amongst them, take the respiratory oxygen. According to Preyer, the average amount of hæmoglobin for the adult male is 14 grams to each 100 grams of blood, and it is estimated that in the blood of a man weighing 12 stone, there are contained about 500 or 700 grams of hæmoglobin, which is distributed in 25,000,000,000 of corpuscles, giving a total superficial area of 3200 square metres. Practically all this large surface of hæmoglobin is available for the absorption of the oxygen from the air in the lungs, for, owing to the great number and minute size of the capillaries, the blood, in passing through a capillary area, becomes subdivided to such an extent that the red corpuscles stream through the capillaries in single file. This is especially the case in the lungs and brain, in which the

capillaries are very fine, and thus in streaming through the lungs each corpuscle becomes exposed to the action of the air, and the utilization of the entire quantity of hæmoglobin present is almost perfect. We are too apt, however, to concentrate our attention on the mere respiratory history of oxygen as taken up by the red corpuscles, but it is to be borne in mind that oxygen, after it has reached the tissues, participates in the chemical changes of the organism and forms an integral part of nutritional processes. It takes an important part in the changes that occur in foodstuffs from the time that they are absorbed from the alimentary canal until they are eliminated in the excretions. The presence, therefore, in the blood of the adult male of ten per cent. more hæmoglobin than exists in the blood of the adult female, must mean some difference in the quantity and quality of tissue metabolism, and therefore of brain metabolism in the two cases, and it becomes important to determine whether the same difference in the composition of the blood that exists in the adult exists in early life when growth is going on and at what age it is established. It does not exist in early infancy. In one case in which an observation was made at an early stage of embryonic life, the red corpuscles were found to number only 3·3 million per cubic micro-millimetre. For the first few days after birth their number seems to be excessive, but in about a fortnight the normal is reached and the number is the same for both sexes and remains so during infancy. As beyond that age I could find no observations on the point, I resolved to make some for myself.

With the kind assistance of Dr. Kimmins, Chief of the Education Department of the London County Council, and of Mr. Restall and Miss Lacy, head master and head mistress of the Elementary School at Wild Street, Holborn, ten boys and ten girls of twelve years of age were selected, all normal, in good health, and of average bodily and mental vigour, and specimens of their blood were taken. The specimens were collected at eleven o'clock forenoon, and the counts were carried out with the most scrupulous care. The result arrived at is, that at twelve years of age the number of red corpuscles is considerably greater in girls than in boys—the average for the girls being 4·830 million per cubic micro-millimetre, against an average of 4·603 for the boys.

The counts in the case of the boys are remarkably uniform. With the exception of one boy, who showed 5·30 red corpuscles per cubic micro-millimetre, and who is reported to be a singularly sturdy, fit, strong, and vigorous little fellow, always in the pink of condition, all the others ranged between 4·15 and 4·98, and in five cases the range was between 4·40 and 4·60. Boys therefore, at twelve years of age, have blood of the pre-sexual or feminine type, and give no indication

of prepubertal disturbance. But with girls of twelve, the case is very different. In them the fluctuations in the number of the red blood corpuscles is much greater than in boys, ranging, in my observations, from 3·95 to 5·85 per cubic micro-millimetre, while the average number present is in excess of that in the adult woman, being 4·830 against 4·500. In four of the girls examined the number of red corpuscles actually exceeded that of the adult man. In one the number was exceptionally low, only 3·95, and this girl, as I have since ascertained from Miss Lacy, had had an operation at the back of her nose recently and was at times short of food, so that she should perhaps scarcely have been admitted to a healthy group. Another girl who gave a low count, 4·10, proved to be of Italian parentage and has been headachy and out of sorts since an attack of influenza. Leaving out of account these two girls, the average number of red blood corpuscles for the other eight would have been above the adult male average of 5,000,000. It is clear that girls at twelve years of age have already entered on the prepubertal stage of accelerated physiological activity when rapid constitutional changes are going on and when there is a demand for rich blood.

The blood counts in girls and boys at this epoch of life closely correspond with what we know of their rates of growth. The yearly percentage increment in weight, according to Donaldson's tables, is from ten to eleven years of age, practically the same for both sexes, being 11·6 for boys and 11·4 for girls, but in the following year, eleven to twelve, a marked difference declares itself, the percentage increment for boys being 6·5 and for girls 9·9. In the following year, twelve to thirteen, the difference is still more conspicuous, the percentage increment being 7·1 for boys and 11·9 for girls. Next year, thirteen to fourteen, the maximum difference is reached, the percentage increment for boys being 7·8, and for girls 14·4, or just double. After that the boys forge ahead, while the girls, having exhausted their special spurt of growth energy, fall behind. From fourteen to fifteen years of age the boys show a percentage increment of weight of 11·0 against 10·8 for the girls, and from fifteen to sixteen the boys' percentage is 15·7 against 9·8 for girls.

As regards height, girls show a greater annual increase than boys from the eleventh to the fourteenth year of life, when boys again take the lead. Between eleven and fifteen years of age the average English girl is heavier and taller than the average English boy, and, in her, constitutional changes come earlier than they do in him and are of more serious physiological import. To support these constitutional changes there is a more active hæmatopoiesis, as it is called, or production of red corpuscles in the bone marrow, the spleen and lymphatics than at

any other period of life. This active production of red blood corpuscles in the female goes on for three or four years, but gradually subsides during adolescence, and at nineteen to twenty years of age the relative composition of the blood of the female becomes what it afterwards remains throughout life while health is maintained.

Again, through the kindness of Dr. Kimmins, I have had the blood examined of twenty healthy normal young men and young women—ten males and ten females, of twenty years of age, students at the Goldsmith's Institute, New Cross—and the number of red corpuscles in them reaches exactly the adult sex averages. The average for the man is 5·009, that for the woman 4·4800. The range of variation in individual cases is again greater in the females than in the males, showing as indeed other physiological and pathological conditions indicate, that the blood-forming tissues in the female are more unstable than in the male, and much more susceptible to constitutional and external influences. The transition from the infantine to the adult blood type is steady and gradual in the male; in the female it is abrupt and subject to violent disturbances. Girls are, of course, liable to anæmia at the rapid growth period in a far larger proportion than boys, and in them the anæmia sometimes assumes the extreme form of chlorosis, in some cases of which the blood count falls to under one million corpuscles per cubic micro-millimetre. In chlorosis, the chief feature of which is diminution of the amount of hæmoglobin, the blood count in a large number of cases has averaged about four million, a reduction below the adult female average of four million five hundred thousand, which seems small considering the gravity of the symptoms, but the reduction is really much greater than that, for I have now shown that the average blood count in girls at the growth period should be five million, and the diminution to four million in chlorosis really means a reduction of two tenths.

The blood counts in girls at the rapid growth period, when momentous changes are taking place in body and mind, seem to me of great significance, and must be well weighed in connection with our educational arrangements. Marked cases of anæmia are recognized and treated, but there is a large amount of slight anæmia about that escapes detection. Girls grow sluggish in their work and are pronounced lazy, or they look pale and are urged to more active outdoor exercise, but all the time it is poverty of the blood that is at fault, and that will not be relieved by tutorial monitions or violent hockey. I cannot enter here on the etiology of the anæmia of girlhood, but I would say in passing that one prolific cause of it is what I have called *anorexia scholastica*, that loss of appetite with impaired digestion so

often seen in these days in eager and overworked schoolgirls, a loss of appetite that will certainly not be remedied by muscular exercise, for as Sir Lauder Brunton has said, "when overstrain of the muscles is added to overstrain of the brain the stomach strikes work, digestion is spoilt, and indisposition ensues."

(*To be continued.*)

THE INFLUENCE OF DEFECTS OF HEARING IN RELATION TO THE MENTAL AND PHYSICAL DEVELOPMENT OF THE CHILD.

By JAMES KERR LOVE, M.D.

A Paper read at Conference of the Child-Study Society, held in the University of London, Friday, May 10, 1912.

Introductory.—The title of this paper at once raises the question of the relative importances of the senses in the education of the child. I use the word "education" as embracing mental and physical development, and in order to limit this paper I exclude the senses of taste and smell because they are seldom perverted in children and because deliberate attempts to educate them do not form any large part of the training of children. Of the remaining senses one is tempted to exclude touch also, and to deal only with sight and hearing, the two great gateways of knowledge used in education. But touch is more important than at first sight appears, for whenever sight or hearing becomes impaired, it is raised to the first rank as a means of education.

The Sense of Touch.—The information which reaches the individual through the sense of touch is much more extensive than we commonly think. By touch we know the position the tongue must occupy for the articulation of words, the position of a bolus of food during mastication and preparatory to swallowing. The sense of touch in the fingers tells of the smoothness or roughness, the hardness or softness of surfaces. By sight alone one cannot tell whether the edge of a knife or the point of a needle is sharp. The real quality of the edge or the point has to be tested by the sense of touch. But the sense is not confined to the tongue and fingers. We are sure of the ground we tread on by the sense of touch, and when this becomes impaired, as in locomotor ataxy, the gait becomes awkward in spite of the presence of the senses of sight and hearing. The sense of touch is the most widely distributed in the body, it is universal on the skin surface, and much of the exhilaration of

a walk in the open air comes from the effect of the wind and the sun on the sense of touch.

The value of the senses of touch is best appreciated by, and its power most developed in, the blind and deaf. In Helen Keller's book, "The World I Live in," the power of touch is finely portrayed. Here a single sense greatly developed and carefully used is made to guide a deaf and blind girl amongst mysteries of a world which is mysterious to thinking persons provided with all five senses.

The range of the sense of touch is more limited than those of sight and hearing, but within its own sphere the information is more accurate than that reaching the individual by any other channel. The sense is seldom perverted in young children, and is the last and only resort in the education of those who are both blind and deaf.

The Sense of Sight.—For several reasons the sense of sight has been exalted to the premier position amongst the five senses. The spectacle of a blind man always moves to pity to a greater extent than does the meeting with a deaf man. The joy got from broad patches of colour, from variety in shape, from beauty of form, and from the appreciation of perspective is a joy we feel we would almost die rather than do without. And yet if we exclude the special use we make of sight in reading, it is astonishing how little accurate information the average man gets through the sense of sight. When he returns from a function he can seldom tell his wife what Lady So-and-so or Mrs. Blank had on, even to the colour of her dress. And few of us, whether man or woman, could name ten articles out of a hundred occupying a shop window at which we had spent five or ten minutes. No doubt the power of observation in which the eye plays so large a part varies with the individual, and is capable of great development in all, but, speaking generally, the impressions reaching us through the sense of sight are general and broad rather than detailed.

The Sense of Hearing.—The acquisition of speech by man has made the sense of hearing *facile princeps* the educational sense. Strike a child blind and you can carry on his education without any profound alteration in method. Strike him deaf and all your methods have to be radically altered. I am here speaking of the young child. In a letter to the writer, Helen Keller puts this better than it has ever been put.

"The problems of deafness are deeper and more complex if not more important than those of blindness. Deafness is a much worse misfortune. For it means the loss of the most vital stimulus, the sound of the voice, that brings language, sets thought astir, and keeps us in the intellectual company of man."

We are thus led to consider the influences of loss of hearing on the

mental and physical development of the child. I assume the very young child is meant here. It is during the very early years of life that both mental and physical development are most rapid. By contrast, the difference between a child at birth and a child at six or seven years when he enters an elementary school, is far greater than during any equal subsequent period in the life of the individual. At birth there is neither sight nor hearing, and all movements are the result of reflex action, without purpose or intent. At seven years the child has been transformed. Alert, rapid and accurate in every movement, quick of ear and eye, a great imitator, able to receive and to express thought, in possession of a vocabulary sufficient for all the real needs of living, the child has been undergoing a process of education at a rate with which all the progress of the schools is slow. The great instrument in this progress is the acquisition of language, and in the hearing child this language is speech. Writing, a much later form of language, both in the history of the race and of the individual, has not yet been taught the child. But he talks constantly to his father or his mother or his little fellows, if they be near: the girl to her doll, the boy to his teddy bear or his tin soldier, if there be no other company. He is a great questioner, and the average father or mother is a fine teacher. With the notion that the little boy or girl is the finest of his race ever born, with a method so correct that modern schoolmasters have adopted "the mother's method" of teaching language, no wonder progress is rapid. For thousands of years heredity has been shaping the mother efforts to the needs of the young child, and teachers do well not to remove the child too soon from the control of the mother, and to follow her methods in subsequent education.

But when deafness sets in, or, worse still, when the child is born deaf, this born teacher, the mother, loses all her bearings. Try for a moment to put yourself in the position of a mother who, say, when her child reaches the age of eighteen months, is faced with the terrible discovery that her little one is deaf. The child has not begun to speak. She has been accustomed to hold out her arms, and the child has responded by burying its head in her bosom, the smile and the frown and other simple natural signs and gestures have been common to them. But the spoken word has never come; and the spoken word must come if thought is to develop. Writing and finger spelling cannot be taught at this age, and signs and gestures will not carry the child into the region of accurate thinking. Nothing but the word will do. The mother is an expert with the word; but without hearing the child can make nothing of the word, and at this age the production of the word by the imitation of muscular movements as seen on the face, tongue,

and lips is not possible. How would you, in these circumstances, teach the child the word "dog"? Your bow-wow which would be heard by the blind child, and recognized as like the bark of the dog, means nothing to the deaf child, and you have no terms by which to convey the idea of roughness or smoothness as applied to the coat of the dog. Now, the teachers of the deaf will tell you how they do this. My present purpose is to point out that absence or great defect of hearing arrests mental progress, and that at eighteen months a deaf child begins a period of intellectual stasis which extends to the age of seven years, when he enters school. The physical counterpart of this intellectual stasis is that the deaf child at seven years has a smaller brain than the hearing child of the same age.

The second effect which deafness has on the mental development of the child relates to the nature of his thought processes. Most of us think in whole words as we have heard them spoken. The deaf child must think in something he has seen: the printed word, the picture of an object or action, or perhaps in a few cases in muscular movements which he himself has made in producing words. I have often noticed, in giving quite simple arithmetic tests to the upper classes in schools for the deaf, a curious hesitancy or slowness to understand the problem. This could not be explained by the intrinsic difficulty of the problem, because the arithmetical attainments of the class were far above the question involved. I believe it comes from the fact that our senses supplement one another in expediting thought processes, and that the absence of hearing, on which thought processes so much depend, finds no adequate compensation by increased activity of the other senses.

Hence thought processes in the deaf are slower than in the hearing. Deaf-mutes are seldom great readers. On the other hand, they play cricket well, a team of deaf hockey players or of deaf football players cannot be known by any inferiority in their play, and often beat a corresponding team of hearing boys or girls. Deaf boys swim as well as hearing boys, they run as fast, they make excellent handicraftsmen. Wherever hand and eye, muscle and bone, tendon and nerve, are the chief factors which make for success the deaf are equal to the hearing; but without the great cortical centre which governs the sense of hearing and which links sound to muscular movement by the spoken word, thought processes are slower. The presence of even some hearing, as in the semi-deaf, or of some remains of unforgotten speech, as in the semi-mute, makes the deaf child an auditive, like the hearing child, and vestiges of speech and hearing become valuable assets in education. These considerations do not establish any mental deficiency amongst deaf children. They are, rather, statements of mental

obstacles or difficulties, centreing round the acquisition of language. Were attempts made to use the five years which are now lost to deaf children, the years from two to seven, and were the education of deaf children carried on till eighteen instead of sixteen years as at present, they would leave school with much better speech, with a command of language comparable to that of the hearing child, with a power to read newspapers and books which they now seldom open, and consequently with a widened interest in life and a greater efficiency as citizens. Deafness and mental deficiency cannot be too thoroughly dissociated. Mentally defected children occur amongst deaf children as they do amongst hearing children. But the mental effect is due to a disease like meningitis which has caused the deafness, and the ravages of which have not been confined to the ear or the hearing centres. Or it may be due to degenerative changes involving the whole brain and including the hearing centres, as I think it often is in sporadic congenital deafness. There is an impression amongst teachers that children who are hereditarily deaf children, who have deaf relatives either in the direct line or in collateral branches of the family, are seldom mentally defective. I have collected opinions and figures on this point which I hope to speak of on an early occasion. My object here is to show that deafness in itself is not a cause of mental deficiency, that education is quite equal to the task of equipping the deaf child mentally, and that when deafness is associated with mental deficiency it is a concomitant and not a cause.

The preceding remarks apply chiefly to true deaf-mute children. When hearing is present for the louder voice sounds, a kind of vocabulary is got by the child, and if individual attention be given to the child, educational progress is attained at a fairly normal rate. In an elementary school, however, such a child makes little more progress than a deaf-mute child does. These are the semi-deaf children for whom provision is now only beginning to be made.

When deafness comes on at four or six years of age, and when it is complete, dumbness follows. Without special teaching this occurs in a few months. With special teaching, not only may it not occur, but even when speech is lost the latter may be resurrected. Although the art of speaking has gone, the memory of words has not been obliterated, and it is easier to revive the lip and tongue movements which produce speech than it is to create them in a deaf-born child.

Two interesting features are noticed in dealing with these children. The commoner one is that if they be left in an elementary school, progress becomes almost quite arrested, and though under the present arrangements such children are passed on from standard to standard as

the years pass, one finds them at twelve and fourteen years with the educational accomplishments of just half that age, six or seven years, the age at which such deafness usually comes on. The second feature is rather uncommon and consists of the parrotting of words and sentences. A semi-deaf boy with a quick eye picks up partly by hearing and partly by lip-reading snatches of what is taught, and I have heard such a boy recite a verse or sing a song correctly in tune, not a word of which he understood. These semi-deaf and semi-mute children when removed to special schools make very rapid educational progress, and are themselves greatly delighted with the educational change.

Nearly twenty years ago I showed that deaf children who were plainly fed and clothed and who were reared in the really good hygienic conditions which obtain in most of our Institutions for the Deaf, were not inferior to hearing children in physique. Weight, stature, and chest measurement were shown to be as good as in middle-class elementary schools. I do not recognize, therefore, that deafness in itself militates against good physical development. The chief physical change or difference between hearing and deaf children is the slightly less head measurement of the latter, due, I think, to neglect of them during the period of language formation. When deaf children are physically defective, the defect is not due to the deafness; the deafness and the defect are both due to a common cause. Deaf children seem to me to have a greater tendency to adenoid growths of the naso-pharynx than hearing children, and when one considers the less use made of the muscles of the palate and pharynx in deaf children, this result is partly explained.

The suggestions which grow out of these considerations on defects of hearing are, I think, these :—

1. Young deaf children should commence some kind of language training at three years of age or as soon as the fact of deafness is discovered.

2. The school period in schools for the deaf should be extended to eighteen years of age.

3. Every effort should be made to use the remaining speech and hearing of deaf children, and the semi-deaf and semi-mute should attend special schools from which the true deaf and dumb should be excluded.

THE INFLUENCE OF DEFECTS OF VISION IN RELATION TO THE MENTAL AND PHYSICAL DEVELOPMENT OF THE CHILD.

By N. BISHOP HARMAN, M.A., M.B., Cantab, F.R.C.S.

Assistant Ophthalmic Surgeon West London Hospital, Oculist London County Council Schools.

A Paper read at Conference of the Child-Study Society, held in the University of London, Friday, May 10, 1912.

The influence of defects of vision upon the mental and physical development of the child can be best judged of by taking extreme cases. First let us consider what influence vision has had upon the mental and physical development of man; secondly, what influence is exerted by the loss of sight.

The first of these propositions—the influence of vision upon the development of man—is one of the most interesting pieces of morphology that can be contemplated. Why has man assumed an upright position? Why has the snout vanished and a fair, round, flattened face taken its place? The answer is, all these radical changes in the conformation of man have been the result of a steady progression towards perfection in the organs of vision.

Man now lives by his eyes, he relies upon his sight more than upon any other of his senses. The form, the colour, the size, and the distance of objects are all measures that he is constantly taking by means of his eyes. He fills his memory with living pictures; remembrance is the revivifying of pictures once seen by his eyes, or of pictures conceived by an imagination fed upon visual impressions.

The growth and perfection of binocular vision, a faculty which greatly increases the judgment of form, and by which almost alone we judge of the size or distance of objects, is eloquent testimony to the important part that sight plays in the mentality of man. The senses of touch, smell, and hearing are admirable possessions, indispensable truly to the whole man, but they are not the first line of sensation of a man. With other animals it is different. The dog stores his mind with the remembrance of smells, the horse with the recollection of sounds; the dog smells out the object of his search, and is at a loss to recognize his master when to windward of him. The horse recognizes familiar voices, he is terrified at unknown and sudden noises, but can find his way in the dark by the judgment of the sounds of the road when his master is quite at a loss for his position.

Man wants to see, then he feels he knows; the experience has passed into a proverb. "Seeing is believing."

So much for the pre-eminence of vision as the organ of sense in man. Now consider the condition of those whose sight has been lost.

When that loss has taken place in infancy the influence is profound. In earlier days so hopeless was the lot of such that the "poor blind beggar" was a familiar object. To-day the excellence of the modern training of the blind has done away with the beggar, but any teacher of the blind will tell you of the difficulty of stimulating the remaining sense faculties of these children. Take one point only. Perhaps the most difficult of lessons to teach the blind is "deportment," and particularly facial control. They readily contract habits, various sorts of antics or contortions, and picking at the eyes, all of which are liable to become disgustingly ugly, and which, if carried into adult life, still further handicap the blind in their dealings with normal folk.

The advantages of perfect sight are acknowledged; the grievous handicap of loss of sight obvious. It follows that every sort of defect of vision presents a disadvantage and handicap; according to the degree of that defect so will be the handicap.

To bring the discussion to a focus let us consider briefly the conditions and influences of certain well-known defects of vision. Hypermetropia, astigmatism, and myopia are names well known to you all, no doubt some of you suffer from one or other defect and can remember the subjective symptoms that first called your or your friends' notice to it. The hypermetropic eye is too small an eye, it is short from before backwards, so that parallel rays entering it are not focussed upon the retina. To meet the defect the internal muscles of the eyes contract, and by altering the shape of the lens within the eye focus the rays. When the manner of life is such that sight is in the main of distant objects, across sea and land, this effort of focussing is not serious for young people. But when long hours of close work in school have to be endured, or when ill-health enfeebles muscular power, then trouble is found. Eyeache, headache, blinking, and mental fatigue are complained of; or a cast in the eye, a "squint," with its destructive effect on the precious faculty of binocular vision may appear.

Astigmatism is an even more prolific source of trouble to the school-child. The term means, literally, "that which has no point." The astigmatic eye has no focus under any condition; the rays entering the eye cannot be brought to a point or focus. Nevertheless, the eye is always trying to focus and see clearly, and fatigue is readily induced. Besides, the appearance of objects is distorted, shapes are changed.

One has only to look at the appearance of one's own face in the comic mirrors found at the doors of some cheap eating-houses, and marked "before" and "after" dinner, to appreciate what the distortion of gross astigmatism means. The ill-effects of such a defect of vision are all those caused by hypermetropia, only these effects are more certain to follow. Further, there is another sequela of even more serious import —the induction of myopia or short sight.

When vision is poor, work that has to be seen is held closer to the eyes to increase the relative size of the object of vision. This action necessitates excessive turning in or convergence of the eyes; the movement causes pressure on the globes by the surrounding muscles, and to this pressure I am inclined to attribute the progressive bulging or stretching of the coats of the eye which we call myopia. Once myopia is started, the conditions act and react in a vicious circle; the myopia needs a still closer approximation of the objects of vision, and the ill-effects of undue convergence are increased. This may not be the whole truth of the causation of myopia, but it is a great part of it, and the part we have to bear in mind for practical purposes.

Myopia is one of the products of forcing a raw civilization upon our children. We set them at our things—books, paper, and pencil—at too early an age. And later we are amazed to find their eyes have become permanently attuned to the evil habits we have inculcated. They can no longer see in the distance; the beauties of Nature's wide-open book are blurred to them; they can only see our books. We have made them bookworms and smugs; a pale-faced, hollow-chested, round-shouldered tribe, who feel alive only indoors, and lost on the broad heath. They see men as trees walking, and trees as blurred masses of indistinguishable character, until such time as the defect is noticed, then they go bespectacled, and see all framed in a rim of metal! This is no fancy picture drawn by one whose views are dominated by a prolonged experience of hospital work. This is my observation from an associated work in hospital and in the schools. Let me give you the results of the examination of 1100 London school-children suffering from defective vision (disease excluded). The following were the classes and proportions of defects found :—

Hypermetropia.	Hypermetropic astigmatism.	Mixed astigmatism.	Myopia.	Myopic astigmatism.	Odd eyes.	Totals.
468	315	78	102	115	22	1100
42·55	28·64	7·09	9·27	10·45	2	100

Putting these classes into two groups we get (1) hypermetropia, including hypermetropia astigmatism, 71·19 per cent. of the cases; (2) myopia, including all the rest, 28·1 per cent. These cases represent about 10 per cent. of the school children; so in London about 3 per cent. of elementary scholars suffer from this progressive condition of myopia and all its attendant evils. To combat this condition it has been found necessary in London County Council schools to establish "myope classes," where defective children are taught such script as is necessary to them by blackboard work freearm fashion; whilst the main part of their curriculum is oral teaching and handicraft. I should like to see this rational system of education extended to all infants or children under seven years of age.

This brings me to one of the gravest of all the defects of vision. It is a defect that every one of us has suffered from at one period of life, and it is the defect the condition of which we can take into account with the greatest certainty and greatest measure of success. That defect is—**immaturity**.

The eye of the child is immature, it is growing, and it must be provided for with just as much forethought as the child itself.

I do not doubt you are familiar with the physiology of vision as propounded in our modern text-books. It is a revelation of beauty that cannot fail to impress you. But, if I may venture a criticism upon the manner of that exposition, it would seem that too often the eye is considered as an organ or optical instrument of equal power in every one, barring certain irregularities such as errors of refraction of which I have reminded you, defects of colour vision, and so forth. To start with such an idea is to lay the foundation for a mischievous scheme of education just as much as the conception of our nearer forefathers that the boy was a miniature man, so that the good of the man was also the good of the boy. I want you to grasp, at the outset, the conception of the growing eye. To grasp the idea of the progressive increase of the size and power of the eye, and of the correlated development of the organs of perception and reception, until the full growth of the human visual apparatus is attained, with its marvellously intricate interaction of eye, brain and hand, so that what the eye sees is understood of the brain and translated into the refined and delicate output of the skilled worker. To those of you who are parents there must have come a realization of the immaturity of the eye of the new-born babe. The eye is there, apparently complete in all its parts; to the gross examination of the most skilled microscopist it may seem a perfect eye unto its finest details. But very simple observations will show that the eye of such an infant has precious little vision. It may be a space of many

days or weeks before the infant will notice the stimulation of light, much less recognize the most familiar object of its existence. But gradually the mother finds that it "notices" her, and her heart is doubly warmed towards her babe; and later it distinguishes between its constant guardian and the casual stranger, who is greeted, it may be, with tears and the grimace of unconscious distrust. There are in these things evidence of the inception of the functions of the eye, the growth of vision, that is, eye and brain are beginning to find themselves.

Or again, we may watch the actual growth of the eye. The pigmentation of the iris may be watched, and its alteration witnessed from week to week. The muddy indistinct smoothness of the slatey-blue iris of the new-born may be seen to clear so as to display the delicate superficial tissues of a blue eye; or else we may see the gradual appearance and spread of surface pigment to the complete painting of a brown eye. I might cite further known changes in the size of the cornea and lens, but the instance of pigmentation is enough to support the gradual change from immaturity to maturity.

Or we may watch the appearance of those higher powers of vision which particularly distinguish man from other animals. I mean full binocular and stereoscopic vision. I cannot do better than quote you the terms of an ancient observation recorded in that mine of interest the *Diary of Pepys*. Like most laymen, he delighted in doctors' gossip, and he recorded the following in the narrative of his voyage with Charles II. from France at the Restoration: "At supper the three doctors of physic again in my cabin, when I put Dr. Scarborough in mind of what I heard him say—that children do, in every day's experience, look several ways with both eyes, till custom teaches them otherwise; and that we do now see but with one eye, our eyes looking in parallel lines."

Now these observations of the growth of the eye in babes are but the more striking features of a growth in visual power that continues far into school life, and the whole of this development is dependent upon proper and balanced external stimuli. Contrariwise, a very short disturbance of the normal stimulus of light will arrest the growth of the infant eye; and irregular or too severe or prolonged stimuli to the eye of the school child will tend to the production or accentuation of temporary or permanent defects in visual power. An extreme case will best show what I mean.

The disastrous effects of ophthalmia neonatorum upon the eyes of infants is well known. In many cases the cornea is irreparably damaged, maybe the eye is lost. There are other cases in which the surgeon is called in time to check the disease with little permanent

damage to the cornea; but in later years some of these are found in our blind schools, with eyes that show the least traces of the inflammation, yet with constant nystagmus (a swaying movement of the eyes) and such poor vision as to leave no doubt that the growth of the eye was stopped during that period of intense inflammation. The prolonged closure of the eyes in the early weeks of life, when we expect the final stimulus of light to be sensibly recognized, has deprived the macula or the sensitive spot of the retina with something necessary to its growth—that is, light.

Similarly the improper exercise of the eyes in the growing years of a child, either by reason of bad or excessive light, the use of improper materials, prolonged close work, or of any work at all during conditions of poor health, will account for the onset of asthenopia, squint, myopia, or even of symptoms of mental disorder of a serious sort in those constitutionally predisposed.

To enter into a discussion of these points, which are really the proper ordering of a school and of its curriculum, is beyond the terms of the title of this discussion. But let me say this much, there is no mystery about the matter, there is required only the application of reasonable thought and of common sense. I would commend to your attention in this connection a recent discussion on School Lighting (*Illuminating Engineering*, March and April, 1910), and the report on school books prepared by a special committee of the British Association which will be issued at the summer meeting of this year.

In conclusion. The work done by the eye, by its muscles, by its sense organs, and by the whole intricate ramifications of neurons which convert reception of images into perception and reaction, is so great that to strain the growing eye of a child is to do the child "grievous bodily harm"; whilst should that eye be already handicapped by a defect of shape, size, or muscle equipment that harm is certain to be intensified and the handicap increased. These conclusions point to the necessity for the strict limitation of the eyework of the young child, and the necessity for the detection and treatment of defective children by the provision of effective school inspection and treatment, and a suitable curriculum for those so defective as to be incapable of following the regular school routine.

THE INSTRUCTION OF THE YOUNG IN SEXUAL HYGIENE.

By ERIC PRITCHARD, M.A., M.D.

A Paper read at Conference of the Child-Study Society, held in the University of London, Saturday, May 11, 1912.

In the first place, some explanation is due from me in justification of the title which I have adopted for this paper. It has been suggested that it would have been better to have employed the comprehensive term "Sexual Pedagogy," or that for "Sexual Hygiene" the term "Sexual Matters" or "Sexual Physiology" might have been profitably substituted. I thought, however, that the larger term, "Sexual Hygiene," might be understood to include those many aspects of the sex question which have for their common objective the scientific teaching of morality. The truth of the matter is that in this comparatively new science we are faced, as Dr. Saleeby has expressed it, with terminological difficulties. We have no suitable vocabulary, and such words as "Sexual Hygiene," "Sexual Instinct," "Reproduction," "Pregnancy," are not only distasteful to those who are entrusted with the difficult task of explaining the origin of life to young persons, but it is also very doubtful whether they are capable of conveying the desired shades of meaning to the undeveloped understanding. With the growing importance of this subject it is to be hoped that our language may be enriched with a more dignified and picturesque nomenclature. In examining the reports of the Successive International Congresses on School Hygiene it will be noticed that both the French and German languages are equally sterile in this respect.

But these successive reports, published respectively in the years 1904, 1907, and 1910, prove that if its vocabulary has not been materially enriched, at least public interest in the subject itself, as measured by the length and number of the papers recorded, has increased by leaps and bounds. It is now no longer a matter of debate amongst international experts whether children are to receive instruction on matters which relate to sex hygiene. No! The question that now demands attention is who is to teach them, how, when, and where! But so far only some slight echo of this agitation which has aroused educationists on the Continent and in America has reached our shores.

Although we have not yet accurately determined the position of sexual hygiene in our system of education, none the less there are certain points with respect to which there does appear to be universal

agreement, and on which our ideas have attained to a condition of crystallization. First and foremost among these accepted postulates is the demand that children should be told the truth, not necessarily the whole truth, but truth sufficient for their present needs, and co-ordinated to their powers of understanding. "Better," said Ruskin thirty years ago, "a child should be ignorant of a thousand truths than have consecrated in its heart a single lie." And to-day we cannot improve on this apothegm. It is quite impossible for normal children to remain in entire ignorance of the phenomena of sex, such a belief assumes that they have neither eyes nor ears, that they are void of curiosity, and barren of the great primary instinct of sex. No normally constituted child can avoid drawing inferences from what he sees and what he hears, from the conversation of others, from the biological experiences of everyday life, and this under the most favourable circumstances of the sheltered life in a well-conducted home. But even in these sheltered homes there is always a very real danger of wilful contamination by impure minded servants or older children. Enlightenment of this kind is the very worst sort of enlightenment that can illumine the innocence of the still unformed mind. But it is nearly always from pernicious sources of this kind that the child acquires his pseudo-knowledge on matters sexual, unless his enlightenment has been deliberately designed by his parents or teachers. To allow a child to run the risk of acquiring undesirable knowledge of this kind in an undesirable way from undesirable sources is, as Havelock Ellis puts it, like admitting "that there is no need to supply sources of pure water when there are puddles in the street that any one can drink of." Thanks to the findings and operations of psycho-analysis we now know that the sexual life of children is much wider and richer than it was formerly supposed to be. And that their relationships with others, their affections, their aversions, their hatreds, their joys and fears are often swayed and determined by that prime mover of our psychological activities, the sexual instinct. Although, perhaps, we should receive with caution some of the assertions made by the more zealous exponents of the psycho-analytical methods, there can be no doubt whatsoever, that a vast number of hysterical manifestations, obsessions, psychoses, and other abnormal, mental, and physical states of children owe their origin to the operations of the sexual instinct, perhaps unduly provoked, almost certainly unnaturally repressed. It is indeed difficult for the uninitiated to understand that such apparently innocent habits as the making of grimaces and the biting of nails can have for their basis a simple repression of this natural and overwhelming instinct. To Professor Sigismund Freud, of Vienna, and his followers, we owe this

unexpected exterpretation of many otherwise inexplicable psychological phenomena.

We know, then, that the sexual instinct is far more precocious in its development than we formerly suspected. And we know, thanks to the work of Freud, that when this instinct is suppressed or repressed it may give rise to strange vagaries of conduct, not only in children but in individuals of all ages and both sexes. It becomes, then, a matter of the highest importance that this dominating instinct—an instinct which indeed does not arise quite spontaneously but at the dictate of some liberating stimulus—should be safeguarded and protected from every conceivable circumstance in the environment which is calculated to exercise upon it a detrimental influence. What are these influences, and how can they be controlled? How can you protect a child of five or six years from circumstances in the environment which can arouse from its dormant state this master instinct? How can we prevent its repression giving place to some equally disastrous neurosis? These ends cannot be attained on the customary nursery principles of instruction. How with our present conception of the propriety of social behaviour can we prevent the repression of those lines of conduct to which the awakening of the sexual instinct inevitably leads the child? Let me give you an instance which actually came under my notice. A small child, four years of age, with the awakening of the sexual instinct, was observed with an imperative desire to expose itself. The child was promptly punished by the nurse, and the incident was not allowed to be forgotten, but the child was frequently warned against a repetition of the misconduct. The child evidently brooded over the trouble, and subsequently developed a serious neurosis. Under these circumstances how should the nurse or the mother have acted? I do not adduce this incident because I have an answer ready, but because I wish to impress upon all concerned the extreme difficulty of dealing with cases of this kind in accordance with rational methods.

I submit that these questions are of enormous importance and most difficult to answer, and I cannot think that we shall find a satisfactory solution to the problem by burying our heads, ostrich-wise, in the sand and saying that they do not exist. I am not one of those who believe that every child should receive its first lesson in sexual knowledge from its mother, and I am of this opinion because I have seen enough of mothers to know that, for the most part, they are absolutely incompetent of conveying this knowledge in a way that would be calculated to be of benefit to the child. Further, I would remind you that most of those who, with the utmost assurance, give the advice that the mother, and

the mother alone, should supply this early instruction to the child, are clearly thinking only about classes, who at least have an education, if they have not an understanding.

But how about the great masses of the people who have neither understanding nor education, how are these mothers to give their children the requisite foundation of sexual knowledge? Among these classes, and I say it with the greatest deliberation, the majority of children have learned more by ocular demonstration before they are three years of age than the children of the upper classes leading sheltered lives learn by the time they are fifteen years of age.

How young children are to be taught the elements of sexual hygiene, how they are to be protected from the stimuli which awaken precocious instincts, how they are to be saved from developing serious neurosis as the result of the repression of these insistent reflexes. Surely this is a matter which calls for the exercise of the best brain power in the country—surely it is not one to be dismissed as offensive to our over-refined sense of decorum and modesty. Personally I have no great opinion of amateur work when there are experts or professionals to be procured. I believe that parents make very bad instructors for their children, and I believe that the two great classes of individuals who are best qualified to formulate an opinion on this question, namely school teachers and doctors, share this opinion with me. I do not know how young children, say of three to six years of age, should be instructed in matters relating to reproduction and the origin of life, but I think that even children of tender age, if they are to be instructed at all, should be taught in the most skilful way and by the most competent teachers. I believe it to be work for experts, and I contend that we must make and create these experts, for we have not got them now. After a time a certain proportion of mothers may perhaps be taught how to perform these difficult duties for themselves.

The psychological moment, or moments, at which children should be instructed in these important matters cannot, in my opinion, be fixed by the criterion of age or the degree of mental development. Each case must be judged on its own merits and by those *imponderabilia* of character which are sometimes known in the aggregate as temperament. Dr. Blom says "better a year too early than an hour too late," but here again I maintain the success or failure of any particular system of teaching depends not so much on the time or the system as on the individual capacity of the teacher. Writing on this subject* Dr. Ira S. Wile suggests that the education of children in sexual hygiene naturally divides into three age periods, (1) the age of mythology,

* *Archives of Pediatrics*, vol. xxix. p. 131.

(2) the age of chivalry, (3) the age of civic awakening, for each of which special rules of instruction are indicated. On the other hand, Dr. Ernest Jones* claims that the aims of enlightenment should be based on the following considerations. (1) In the first place, to inculcate an attitude of purity and naturalness towards matters of sex, so that the child will be steeled against impure suggestions and thereby enabled to maintain high ideals in this respect. (2) To prepare children for the physiological occurrences inseparable from their sexual development, and above all for the function of parenthood. (3) To provide them with such knowledge of sexual hygiene as to enable them to guide their sexual lives amidst the numerous dangers and difficulties that are likely to beset them. According to this régime enlightenment should be brought about by a series of graduated steps, and should be adjusted to the varying needs of the individual child. Dr. Martin Chotzen, of Breslau, one of the greatest authorities on the sexual education of children, lays down somewhat arbitrary rules† for a progressive course of sexual instruction which is designed to extend from infancy until the time of marriage. He insists that for the present lectures in sexual hygiene must be given by medical men for the reason that doctors alone possess the necessary knowledge for this kind of teaching. Further he insists that if sexual education is to be crowned with success it is desirable that the parents and school teachers should be instructed in the necessary details and principles of physiology, psychology, and hygiene. Dr. Chotzen seems to me to fall into the same kind of error that is noticeable in the writing of nearly all authorities who write on this subject—he legislates for the children of the privileged classes. This narrow conception of the sphere of usefulness of sexual pedagogy must be banished from our minds if we are to do justice to the immensity of the subject and the vast numbers of children who have claim to its benefits. We have not to consider the half million children of the upper classes, but the six million children of the proletariat.

I do not pretend to any special knowledge of the practical details of the teaching of sexual hygiene to young children, but of this I feel convinced; the real obstacle in teaching children the elements of sexual hygiene is the difficulty most of us experience in effacing from our minds our own shamefaced conceptions of these fundamental and physiological truths. We find it difficult to forget the impure sources of our own information on these subjects, and impose unnatural barriers to the satisfaction of the child's legitimate curiosity on these points.

* *School Hygiene*, vol. iii. p. 135.

† "Reports Third International Congress of School Hygiene," vol. ii. p. 17.

The object of this paper is not so much to offer suggestion as to invite discussion and stimulate thought. For the present those who are interested in these matters can best expend their energies in preparing public opinion for the changes which are inevitable, in dispelling from the average mind the belief that ignorance is synonymous with innocence, and that purity cannot only be maintained by hiding from the child those fundamental truths which sooner or later it must discover for itself. For my part I believe we are wrong to suggest that parents should themselves attempt to undertake so difficult and delicate a matter as the instruction of their children in the matters of sexual hygiene. I do not think that uninformed individuals should presume to step in where the best instructed and most competent experts only tread with the greatest diffidence and fear. As I have already indicated, children are extremely apt to develop strange and unexpected neuroses as the consequence of the repression of natural sexual instincts. I think it extremely likely that we shall meet with a very luxuriant crop of such neurosis if without wider knowledge of the subject parents attempt to repress these natural instincts by artificial means. I think that the conception that parents can perform this difficult task is a wrong one. I think we are commencing at the wrong end. I would rather suggest that for the present we direct our energies to the formation of societies (Volksbildungsveneine and Elternabende) for the debate and discussion of these questions among parents and teachers; and that lectures on sexual hygiene be included in the syllabus of instruction for intending teachers, and that others be arranged in post-graduate courses for masters already in the profession. And that with respect to the actual teaching of children and young persons we should for the present confine ourselves to the instruction of adolescents and those who have already passed through the critical period of puberty. There does not seem to me to be any pressing hurry to reach the lower levels of childhood; the younger the child the more difficult is it to instruct without incurring the very real danger of repressing natural instincts in a manner that will react most injuriously on its entire organization. I do not for one moment believe that the child by its unaided judgment will arrive at the best solution of this most difficult problem. I believe that in ninety-nine cases out of a hundred the solution arrived at by this means is bad, thoroughly bad; but all the same I do not consider that we are likely to discover any much more satisfactory solution until we know a great deal more about the subject than we do at present. My view, therefore, is that we should essay the easy task first and attempt to instruct young adolescents, and then as we gradually acquire more knowledge of the technical difficulties, and

become more skilled in the practical details of teaching, we should take up the instruction of younger and younger classes of children, leave as little as possible to the parents who have already given abundant proofs of their willingness to shirk this responsibility, and rely to a very large extent on expert knowledge and expert teaching.

HOW A TEACHER CAN TEST THE VALUE OF HIS OWN METHODS: A RESEARCH IN EXPERIMENTAL PEDAGOGY.

By W. H. WINCH, M.A.

I. Why Experiment is Necessary.—All who belong to child-study societies are pledged, more or less, to the following principle: Educational methods must be based on the genetic psychology of the child.

All educational psychologists, by the very nature of their work, hold doctrines which involve the same principle. But it must not be supposed that all questions of method, when the genetic psychology of the child is duly known, become thereby fixed and definite. To some of us, at least, there is considerable satisfaction in the thought that the pedagogical conclusions which can be drawn, even from the most accurate psychological foundation, will leave us with considerable elasticity in our methods. It will still be necessary to try, by actual experience, how much, if at all, one method is better than another. It may even be necessary to show that any method in teaching is better than no method at all. For, nowadays, as in medicine, so in education, there is an increasing confidence in Nature's way. As a practical illustration, most of us are well aware how the "no method" method of teaching drawing has, just at present, gained a victory over the highly elaborated methods of procedure which were formerly in vogue, and the same tendency is being shown in the newer views as to the teaching of reading. For, without doubt, children will learn much for themselves, especially if suitable material be presented. Some educationists have, indeed, asserted that we ought never to do more than merely present material, taking care, of course, that it is appropriate to the different stages of the child's mental evolution.

Well, those who accept the principles of the new science of experimental pedagogy do neither assert nor deny that practice is better than teaching. They are disposed to be dogmatic only in one respect: they are inclined to assert that the only way to be at all sure about these things is to subject them to the test of actual experience. Does practice

produce better results than teaching? Does one method produce better results than another?

"Is that all?" I can hear a number of disappointed teachers saying. "We all knew that long ago. Every good teacher judges his methods 'good' or 'bad' in so far as they produce the results he wants in the best and quickest way." And there are hundreds of inspectors, organizers, and instructors who visit schools and tell the teachers which methods produce the best results. It is true they often contradict one another, but the teacher certainly gets advice.

The whole of our educational system, just now, is permeated with the notion that methods are everything, and, on every side, excellent methods are being recommended to teachers on the strength of the excellent results which they are stated to produce.

What more can we want? Surely, by this time, all the more important questions of school methods have been settled. In suchwise might teachers conceive that an answer could be given to the questions I have raised.

In the minds of organizers and instructors I fear that the *methods* they favour, and the *results* of the methods they favour, are too often undistinguished. They are prone to report the work of schools as improved merely because their own particular methods have been followed. And inspectors and teachers are apt to judge of results, indeed for many years *have* judged of results, and consequently of methods, on a much too cursory analysis of the conditions. Confident assertion on the one side is met with equally confident assertion on the other. Who is your inspector? is held to be quite a relevant question when one teacher is discussing questions of method with another.

All this is very unsatisfactory, and the growth of the sciences of educational psychology and experimental pedagogy is the only pleasing feature in the present situation. But in what way are these sciences to help us? What can they do to establish our educational doctrines upon a more secure basis? The ideal is, that (under guidance, if necessary) the disputed points of educational theory and practice (and which of them are not disputed?) shall be settled by actual experiment in the schools themselves.

I purpose to show what is meant by this statement, not by general dissertation, but by giving an actual research, undertaken to answer a question which was raised by several teachers themselves. It arose in this way. In the course of some lectures dealing with experiments on fatigue and adaptation in school work, the teachers had noticed how general and continuous the improvement of the work of the children seemed to be, even when they had not been taught, but

had merely been practised in successive exercises dealing with the same thing. This had been noticed even in problematic arithmetic, which is currently supposed to demand much teaching before success can be assured. Of course, we cannot *entirely* eliminate the effect of previous teaching, as we can in certain psychological experiments. But noticing the improvement under practice, *without direct teaching*, several teachers said, "Why teach problems at all? The children *appear* to improve just as much without teaching." "Oh no," said others, "the improvement by practice will soon stop, and the children will improve much more *with* than *without* teaching."

The only way to settle the dispute is to try both ways and see "That's easy enough," one is tempted to say, "*until one tries.*" And may I say that the people who try, and who eliminate the causes of failure (for failure is almost certain at first) one by one, are well on the way to become expert experimentalists? And may I say also that they will thereby obtain just that kind of knowledge of children which enables teachers, already good, to achieve excellence? Let us go through the experimental procedure, step by step; let us see what the difficulties of the experiment are, and how they may be overcome.

II. The Precautions needed before the Experiment can be Started.—The first element of importance is the active sympathy and help of the teacher of the class.

I do not by any means overlook the importance of the sympathy of the principal, but I want to insist on the fact that, unless the teacher of the class is also anxious to secure a strictly scientific result, there is a strong probability that the experiment will not succeed. For if the class teacher suspects in any way that the work is inspectorial, that is, conducted with a view to discover whether his work has been properly done, there is very little likelihood that the experiment will succeed; for the temptation will be extremely strong for the teacher to try to influence the results unduly, and to produce some of those marvellous results which are very gratifying to the public at educational exhibitions, but which at once inspire the experienced teacher with feelings of disgust, not unmixed with resentment.

The second element of importance relates to the question of "equal groups." If we try one method with clever children, and another method with inferior children, the clever children will do the better; not because the method by which they are taught is the better one, but because they are the cleverer children. Comparisons instituted between the subsequent work of groups of children which are unequal at the outset are worse than worthless; they are positively misleading. And we must go further; we cannot suppose, because the *general* ability

of two groups of children is about the same, that therefore their ability is the same in the function with which we are specially concerned. We must measure that function first, and it is best to measure it several times, for children vary somewhat from day to day, and, until their work is "steady," it is very difficult, if not impossible, to divide them into equal groups.

A third point of importance is concerned with the nature of the questions set, on the results of which the class is to be divided. They must be hard enough to give even the best children sufficient to do; they must be easy enough to enable the weakest children to do something.

Perhaps, with these preliminary explanations, the details of the experiment, which I now propose to give, will be more readily understood.

III. The Details of the Experiment.—1. *The Class which did the Work.*—This experiment was carried out with the whole of a Standard IV. class of an average age of ten years nine months, half-way through its educational year. The work was done in a girls' school situated in a fairly good neighbourhood in the south-west of London.

2. *The Tests and the Method of Marking.*—The following was the first set of problems:—

(1) A man paid 10*s.* a week for rent, 13*s.* 6*d.* for food, 4*s.* for clothes, and 1*s.* 6*d.* for lights and fires; how much would he save out of 35*s.*? (*Two rational steps.*)

(2) A wheel of a bicycle is 5 feet round the rim. How many times would it turn round in travelling 1560 yards? (*Two rational steps.*)

(3) On Monday a woman paid 3*s.* 10*d.* for meat, on Wednesday she paid twice as much as on Monday, and on Friday three times as much as on Monday; what did her meat bill amount to for the three days? (*Three rational steps.*)

(4) A woman had 300 yards of linen from which she could cut 200 tea-cloths; how many could she cut if each cloth was half a yard longer? (*Three rational steps.*)

(5) A man went out with a sovereign, a half-crown, and three pennies in his pocket. He bought a hat for 5*s.* 9*d.*, gloves for 2*s.* 10*d.*, shoes for 12*s.* 6*d.*, and tobacco for 1*s.* 7*d.* He gave all that he had left to a beggar; how much did the beggar get? (*Three rational steps.*)

The children were required to work the problems in the usual way. But in marking their work, no notice whatever was taken of the numerical accuracy or inaccuracy; *the sole consideration was the accuracy of the rational steps by which they endeavoured to solve the problems.* Any step which was on the way to a correct solution by any method

received one mark. The maximum mark for each problem is given in brackets after each question, *i.e.* one for each rational step. Experienced teachers will need no further indications of how the papers were marked.

The second, and every succeeding set of problems was exactly like the first set in principle, but the wording and the numbers given in the questions were changed.

Thus, to take one illustration, problem 4 in the second set became : A man had 144 pounds of tea, from which he made up 288 packets. How many packets could he have made if he had put a quarter of a pound more tea in each packet ?

In all cases the numerical work was very easy, so that the whole difficulty rested with the methods of rational solution.

3. *Chronology of the Experiment.*—The first set of problems was given on Friday, October 6, 1911, from 9.45 to 10.30 a.m., immediately after Scripture lesson. The second set was given at the same time of day on Wednesday, October 11, and the third set at the same time on Friday, October 13.

On the results of these three exercises the girls were divided into two equal groups. It is by no means easy to divide the children into two groups which are really equal; but, with care and patience, it can be done.

When the two groups had been made out, we were ready to begin the next stage of the experiment. One of the two groups—henceforward called Group A—now received three lessons, in which they were taught how to work problems involving the same reasoning as those which had already been set. They were taught in the following way : Each problem was worked out concretely with small numbers. Then it was worked with small numbers mentally, and finally it was worked by the teacher on the blackboard with large numbers. Meanwhile the other group—henceforward called Group B—had three more practice lessons with three more sets of problems. The teaching lessons and the practice lessons were given from 9.45 to 10.30 a.m., on Wednesday, October 18, on Friday, October 20, and on Wednesday, October 25.

Finally the two groups, A and B, on Friday, October 27, on Wednesday, November 1, and on Friday, November 3, at the same time in the morning as before, worked three further sets of problems, drawn up as on previous occasions. These exercises will be referred to subsequently as the Final Tests, in contradistinction to those which were set at first in order to divide the class into equal groups. The former will be called the Preliminary Tests.

We have now the material to enable us to determine how far, if at all, the group which was taught have made more progress than the group which continued to practise whilst the other group was being taught.

4. *Results.*—The first step was, of course, the correct division into two equal groups. The following table will show how the children were arranged.

TABLE I., SHOWING THE DIVISION INTO TWO EQUAL GROUPS.

Group A.				*Group B.*			
Name (initials only).	Preliminary Tests. 1st.	2nd.	3rd.	Name (initials only).	Preliminary Tests. 1st.	2nd.	3rd.
P. A.	10	10	10	B. D.	10	10	10
N. E.	10	9	11	F. D.	10	10	10
K. M.	8	9	10	I. A.	9	8	9
C. E.	8	5	7	M. S.	8	6	7
20 girls, av. mark	8·3	8·0	8·7	20 girls, av. mark	8·3	8·1	8·6

The maximum mark for each exercise was 13; no child obtained the maximum either in this or in any other of these tests, and every child was able to accomplish something in all of them. Adding together the total marks obtained by Group A in the Preliminary Tests we find that an average mark of 8·3 is obtained per child per exercise, and similarly, for Group B also there is an average mark per child per exercise of 8·3.

Then, it will be remembered, there were three teaching lessons for Group A, and three more practice lessons for Group B. There were, of course, no marks given for these lessons to Group A. The average marks per child per exercise in Group B were, for the first practice exercise 8·2, for the second practice exercise 8·3, and for the third 8·6. It is usual, as teachers well know, for the improvement effected by mere practice to diminish after a time, but in this case it seems rather quickly to have ceased altogether, for the average mark of Group B for the practice exercises is 8·3, which is just the same as the mark obtained in the Preliminary Tests. That improvement has not really ceased is shown by a further improvement by practice later on.

Now come the Final Tests. Group A scored an average mark per child per exercise of 11·0 for the first test, 11·1 for the second test, and 11·3 for the third test; whilst the corresponding marks for Group B were 9·1, 8·9, and 9·6. The mark of 8·9 was obtained after the mid-term holiday, which did not appear to cause a reduction of the mark for the group which had been taught.

Totalling the marks for the Final Tests we find Group A with an average of 11·1, whilst Group B scores 9·2 only. Group A—the group

which was taught—improved on its preliminary record to the extent of 34 per cent., whilst Group B showed an improvement by practice alone of 11 per cent.*

But it remains to be seen how far the difference shown is shared by the more proficient as well as by the less proficient members of the two groups. The following table will indicate this.

TABLE II., SHOWING THE TAUGHT AND UNTAUGHT GROUPS COMPARED, SECTION BY SECTION, IN THE PRELIMINARY AND FINAL TESTS.

	Group A (Practised and Taught).			*Group B* (Practised only).		
Marks in 3 Preliminary Tests.	No. of Girls.	Av. mark per child per test in 3 Prely. Tests.	Av. mark per child per test in 3 Final Tests.	No. of Girls.	Av. mark per child per test in 3 Prely. Tests.	Av. mark per child per test in 3 Final Tests.
30 and over .	2	10·0	11·5	2	10·0	10·5
25 to 30 . .	9	9·2	11·1	9	9·2	9·6
20 to 25 . .	7	7·6	10·9	7	7·6	8·7
Below 20 . .	2	5·8	11·5	2	5·7	8·0

It will be noticed that the group which has been taught shows better results all along the line, the two children at the bottom of Group A show, indeed, quite extraordinary improvement.

IV. PEDAGOGICAL CONCLUSIONS.—Good teaching appears to do much. I say this, believing as I do, that there is too much teaching and too little practice in most, if not in all, of our London schools. But we must not, in putting forward the claims of practice, neglect the proper function of teaching. These girls tried hard, test after test, to obtain higher marks, for they had been told, test by test, how many marks they received. They were, therefore, in a mental condition which was responsive to teaching; it came as a solution of difficulties which they had themselves felt.

This method of dividing a class into equal groups, with the training of one group in one way and of the other group in another way, will enable us to come to conclusions about school methods and practices which are really scientific. By such procedure, gradually, we shall build up a real science of education to which all can appeal, Professors, Inspectors, and Teachers, unified in the common bonds of research and knowledge.

* The variabilities of these averages have been calculated, and the correlation coefficients between the successive tests of the series, in order that what is known as the "probable errors" of the averages may be estimated. Mere averages are not reliable.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Stages of Development.—"The sciences of biology, physiology, and psychology all support the view that each stage of development is preparatory to those that are to follow, and that any disturbance of development at any period is likely to affect the final result. This is most strikingly shown in biology, as, for example, in the case of insects where injury or unfavourable conditions during the larval stage result in an imperfect form of insect. To be a perfect butterfly it is necessary to first be a perfect caterpillar, and to be an ideal man the child characteristics must first be well developed."—*Professor E. A. Kirkpatrick*, in "The Individual in the Making."

The Constructive Instinct.—"From the time the child begins to pile up sand or blocks, through the ages when boys construct tools and dig caves, and men design temples, bridges, business blocks, and balloons, the constructive instinct is prominent. There is a peculiar pleasure accompanying these acts of construction, perhaps because one feels and perceives in concrete form the evidence of his power to do, to modify and change. The destructive tendency is probably only a modified form of the constructive, for it gives the same evidence of power to change. The destruction or displacement of something is often merely a preliminary to the construction of something else of the parts or fragments that are being made. Children frequently break or take apart complex toys and make some crude thing in which they take great pleasure. The constructive instinct naturally associates itself with the adaptive instincts of imitation, play, and curiosity, with the æsthetic and expressive instincts, and sometimes with various other instincts and motives."—*Professor E. A: Kirkpatrick*, in "Fundamentals of Child Study."

How to study Infants.—"Instead of trying to catalogue the child's movements, his various sense activities, his feelings, etc., as most observers of children do, we should more profitably note in the exact order what he does day by day, without any attempt to say what particular point these acts illustrate, watching simply their increasing complexity and the number of elements involved in them. The chief significance of a new movement, a better management of the eye, a sense of position, of creeping, grasping, etc., is not that it simply occurs, but in what sort of activity it occurs, what it helps to do, why it has arisen. To separate the sense-experience or the particular hand-movements, or talking, or the recognition of colour, from the setting to which it arose is to deprive it of its main significance . . . [We are not] as

much interested in *when* a child first says *man* as in knowing *what* he was doing at the time that made him say it, or what he did afterwards *because* he said it. *It is the entire act that is important.*"—*Dr. Irving King*, "The Psychology of Child Development."

The Essentials of a Good Experiment.—"Summarising the essentials of a good experiment, we should say, first of all, let the kind of activity to be studied be definitely marked out. It must then be noted to what extent, without creating any artificial conditions, it can be studied in comparative isolation. Next, the test itself must be arranged so as to give exactly the results aimed at with a minimum of extraneous elements. In the interpretation of the results it is of the utmost importance so to frame the rubrics [headings] under which the data are to be classified that the personal equation of the investigator shall be reduced to a minimum."—(*Ibid.*)

Experimental Work and Training Colleges.—"Research work can alone solve the problems in education. It is being done by the schools of education in the universities. These schools of education are grappling with the real problems in education and life that the normal schools have left wholly untouched. It is my contention that the normal schools are now prepared to enter, and should enter this field of work. . . . Everyone engaged directly or indirectly in the elementary or the secondary schools knows that much of the work is merely 'marking time.' . . . Educators know that there is great waste. . . . The results are deplored and criticised. The people do not know the remedy. Educators are expected to know it, but they do not. They are getting anxious to find out. The people are pushing them on to find out."—*President W. J. Hawkins*, quoted in "The Journal of Educational Psychology," U.S.A., May, 1912.

A Scientific Form of Questionnaire.—"The ideal questionnaire is one which asks for information which the questionee is sure to possess and willing to give, and which he can state briefly and unequivocally—which asks questions, for example, that can be answered by 'yes' or 'no,' or by definite statements of facts or figures. When it goes beyond questions of this sort and asks for matters of personal history or of opinion and belief, it soon reaches a point where a quantitative treatment of the data is impossible, or, if possible, is often misleading. The best that can then be done is to gather the material into characteristic groups or types and to attempt little beyond a liberally illustrated description of these. A second important point is to see that the questions are answered by all the group which you have under consideration, or, if it is too large for that, by a perfectly fair and adequate sample of the whole group. A set of questions with

reference to conversion answered by a class of clergymen would, of course, be hardly a fair basis for inference as to the religious experiences of the man in the street."—*Professor Edmund C. Sanford*, in "The Journal of Educational Psychology," U.S.A., June, 1912.

NOTES.

THE ANNUAL CONFERENCE.

Our annual conference was held, at the invitation of the London Society, in the Jehangier Hall of the University of London—by kind permission of the Senate—on Thursday, Friday, and Saturday, May 9, 10, and 11, 1912. The subject for consideration was, *The Health of the Child in relation to its Mental and Physical Development.*

Besides delegates from the following constituent societies: Birmingham, Cheltenham, Dundee, Edinburgh, Exeter, Halifax, London, Manchester, and Tunbridge Wells; there were present invited representatives for the University of London, The Royal College of Surgeons, The National Union of Teachers, The College of Preceptors, The Head Masters Association, The Head Mistresses Association, The National Education Association, The Sunday School Union, several Assistant Teachers Associations, and about thirty other Educational, Learned, and Scientific societies. Among those present was Miss Crees, one of the three original founders of the old British Child-Study Association. A special invitation was sent to the London training colleges for teachers, offering free admission for a certain number of their students. In response to this a good number of students attended. Miss Alice Woods, a longstanding friend of the Society, made special arrangements with the committee for the attendance of many of the students at the Maria Grey Training College.

The Meetings.—On Thursday evening, May 9, members and delegates of the constituent societies, and others, were received by Sir Richard Martin (President, London Society), Sir Edward Brabrook (Chairman of Council, London Society), and the Council of the London Society. Refreshments were provided in the fine marble entrance hall of the university, where the excellent singing of some boys and girls from the Addison Gardens L.C.C. School, under their headmaster, Mr. M. H. Atkin, was very greatly enjoyed, and a special vote of thanks to them was charmingly proposed by our President.

The President, Sir James Crichton-Browne, was accompanied by Lady Crichton-Browne, to whom a splendid bouquet of roses was presented by Miss Hilda Durrie Mulford. Many representatives from kindred societies were present at the reception, and we had the good fortune of welcoming Sir Charles Mackellar, President of the State Children Department, N.S.W., Australia, and Professor Kirkpatrick (U.S.A.), the author of "Fundamentals of Child-Study," as visitors.

After the reception those present went to the Jehangier Hall where the President delivered his presidential address, with that fine oratorical manner of which he is such a master. Though long it was listened to with close interest, and a very warm and appreciative vote of thanks was passed for it, on the proposal of Professor H. R. Kenwood, seconded by Surgeon-General Evatt.

The presidential address and the papers contributed to the conference will appear in *Child-Study* in due course, and, therefore, we need say nothing about them, as our

readers will be able to form their own opinions at leisure. But we very much wish that we could have given a full report of the speeches of the various chairmen, openers of discussion, and those who took part in the discussions. Much was said that was of great value, but our resources are at present unequal to the cost of reporting and printing such matter. We believe that none will grudge a special word of recognition to Professor Kirkpatrick for his valuable and graceful contributions to the discussions. To the readers of the papers; to our chairmen: Hon. Sir John Cockburn, Sir Richard Martin, Sir Edward Brabrook, Sir James Yoxall, and Professor Adams; and to the openers of discussions: Miss M. A. Broadbent, Drs. Alice Corthorn, Macleod Yearsley, F. W. Edridge-Green, Percy Nunn, the Society's best thanks are due. Also to Dr. Saleeby for his admirable public lecture—see abstract below—and the unusually fine discussion for which he was responsible afterwards, thanks are due.

Many regrets were expressed that, owing to the inventor's sudden and very regrettable death, the demonstration of Mr. J. Gray's appliance for estimating mental aptitudes had to be abandoned. The demonstration with ex-scholars of what may be done for the hard of hearing by a teacher of the deaf, given by Mr. B. P. Jones, was an interesting item, which followed Dr. J. Kerr Love's paper.

The garden party at The Royal Normal College and Academy of Music for the Blind, Upper Norwood, to which those attending the conference were most kindly invited by Sir Francis and Lady Campbell, was very greatly enjoyed by all those who went, who were also much interested in seeing the varied and excellent work of the pupils in the institution.

The reception given by Sir Richard Martin (President, London Society) and Lady Martin at their house in Mayfair, on Saturday evening, was a splendid conclusion, in its generosity and charm, to the conference. It was largely attended, and very highly appreciated.

Some Special Features.—All the papers were printed before the conference, bound up in sets, and sold at threepence a set during the conference. This was arranged so that the papers should be taken as read and the time given to discussion. The result was that excellent discussions took place.

The following were the rules for the discussions: Authors of papers will be allowed twenty minutes to introduce their papers. Openers of discussions will be allowed fifteen minutes. Other speakers will be allowed five minutes. The chairman will ring a bell to warn speakers they are approaching their limit of time; when the bell is rung a second time speakers are asked to sit down. As a rule no one may speak twice except with the permission of the chairman. Those desiring to take part in a discussion must send up their name, address, or card, to the chairman.

The Educational Supply Association provided a bookstall for the exhibition and sale of literature relating to child-study, and carried out the arrangement very satisfactorily.

The Workers.—Many meetings were held and much hard work done—especially by the chairman—by the conference committee consisting of: Miss Stevens, and Messrs. Tibbey (*Chairman*), Hayward, Holman, Jones, Kimmins, Pritchard, Shrubsall, Shuttleworth, and Durrie Mulford (*Hon. Sec.*). The duties of securing hospitality for provincial delegates were competently discharged by a ladies' committee including: Mrs. Richards and Mrs. Truelove, and Misses Stevens (*Convener*), Dixon, Hardy, Jobson, and Cash (*Hon. Sec.*).

The stewarding of the meetings was thoroughly well done by members of these committees, assisted by Messrs. Crisp, Frost, Hayes, Sharman, Sweeney, and Webster.

A very special word of thanks is due to Mr. Durrie Mulford, who, as always, gave

unsparing and ungrudging service to the work of organizing the conference, and did an immense amount of work with his usual thoroughness and competence. He was most ably seconded by Mrs. Mulford, who is a constant benefactor to the Society in practical helpfulness. Nor must the many services of Miss Louch and Miss Cash be forgotten.

The Council Meeting.—This was held in the library of the Royal Sanitary Institute on Saturday afternoon. It was a well-attended meeting, and there was keen discussion on some points. An invitation from the Liverpool Society, to hold the conference there next year, was unanimously and cordially accepted.

Those attending the council meeting were entertained to tea by the Council of the London Society, and a few visitors—including Professor Kirkpatrick—were invited to meet the delegates.

Dr. Saleeby's Lecture.—The following abstract of the lecture was prepared by Dr. Saleeby, and circulated at the meeting :—

Eugenics and Child-Study.—The possibility of any practical eugenics primarily depends upon just discrimination of the individual before adolescence—*i.e.* upon child study. As the lecturer argued in his paper on "Eugenics and Education" before the British Association last year, the eugenist requires the educator to observe, study, and define the children before him, so that, at adolescence, our eugenic duty may be apparent in each case. Only child study will distinguish between the characters that are natural and therefore transmissible and of eugenic importance, and those which are natural, non-transmissible, and irrelevant for eugenics. Most serious objection must be taken to the work of Professor Karl Pearson and his school on this point alone ; the distinction between the feeble-minded and the merely backward child is a case in point, and the American school of eugenists have lately pointed the moral. Only child study, also, can make those discriminations which are necessary in order to refute the party of eugenists, sprung up since the death of Sir Francis Galton, whose verdict on our present infant and child mortality is "better dead," and who may, with convenient ambiguity, be styled the "better dead" school of eugenists.

Delegates at the Conference.—*Birmingham*, Miss A. J. Dawes, L.L.A. ; *Cheltenham*, Miss McCutchan, M.A., Miss Mary Louch, Dr. R. Cunningham Affleck ; *Dundee*, Miss Kate Stevens ; *Edinburgh*, Miss J. K. Borland, M.A. ; *Exeter*, Miss A. J. Walker, Miss Cash, B.A. ; *Halifax*, Dr. D. Taylor ; *London*, Miss Ethel Dixon, Dr. Fletcher Beach, Dr. R. Langdon Down, Dr. A. Beresford Kingsford, Mr. T. G. Tibbey, B.A. ; *Manchester*, Dr. A. A. Mumford, Mr. H. Holman ; *Tunbridge Wells*, Miss Barker, Mr. and Mrs. Pontifex.

In conclusion we may safely say that the conference was in every way a great success, and the London Society is to be congratulated and thanked for the admirable way in which it was organized and conducted. The attendances—ranging from over 300 to over 400—papers, and discussions, were all good, and every one seemed to enjoy and approve the proceedings.

Next Year's Conference.—As mentioned above the annual conference is to be held at Liverpool next year, and the subject to be dealt with is, *Child-Study as a Link between the Home and the School.* The date fixed is May 22, 23, 24.

The Child-Study Library.—The Hon. Librarian reports that there has been a much freer use of the Child-Study Library since the issue of the new catalogue and library tickets. It is hoped that such free use will continue and increase, for there are many periodicals in this library which cannot be obtained elsewhere.

Corrections.—We regret that three misprints appeared in our last issue, and hereby correct them :—in Dr. Beresford Kingsford's letter, seven lines from the end, for *Thane* read *I have ;* and in Mr. Tibbey's review of *L'Educateur Moderne*, second

line (p. 31), for *Comfayré* read *Compayré;* in his review of *Bulletin de l'Education Morale de la Jeunesse* (p. 32), four lines from the end, for Mme. *Prigol* read *Pujol.*

Mr. Winch's Article.—Mr. Winch has been good enough specially to write his article for Child Study in the hope of helping teachers in their practical work. If any teacher who follows out Mr. Winch's suggestions will send an account of the results to the Editor, he will be very glad to consider it with a view to publication.

Reviews of Books.—Owing to the pressure on our space, because of conference matters, reviews of some books, etc., are held over for our next number.

REVIEWS.

Toys and Toymaking. By GEORGE F. JOHNSON, Inspector of Handwork, Liverpool. Longmans, Green & Co. Pp. 160.

Another of Mr. Johnson's excellent manuals, which very fittingly follows his *Rural Handicrafts.* It is designed to provide educative occupation for boys and girls both at home and school. As Mr. Johnson so well says in his preface: "Not the least important of the characteristics common to all children are the impulses which they possess to *play*, and to *construct*. . . . As a means of education in school or home, it is difficult to find a more satisfactory combination of impulses than that of playing and constructing."

Hints are given on how to use the book in the home or school; and these are followed by 104 models, with instructions for making them. The models form an unusually interesting set, and range from a wooden sword to a taxi-cab. At the end of the book there are good suggestions for group work. Every teacher and parent, who wishes to rejoice the hearts of little children, and develop their minds and bodies, should get this book. But one point we would very strongly urge upon them: in every possible case let the size of the object made be such that the child can use it in its ordinary play and playful work. To make miniature models of real things is too near a task for a child, but to make real things for its own use is the joy of joys.

The Gateways of Knowledge. By J. A. PRELL, M.Sc. Cambridge University Press. Pp. vii, 171. *2s. 6d.*

This is a very helpful book on the five senses, and should prove of very great service to teachers who are are taking their work seriously and scientifically. It is written on child-study lines, and some first-rate suggestions and directions for practical experiments are given. Our strong advice is: get it and work at it.

Publications Received.—*Journal of Education; Educational Times; Parents' Review; Educational Review* (U.S.A.); *The Pedagogical Seminary* (U.S.A.); *L'Education Familiale; The Training School* (U.S.A.); *La Escuela Cubana; The Shield; Journal of Experimental Pedagogy; Child Life; School Hygiene.*

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Child-Study.

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MEASUREMENT IN CHILD STUDY.

By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

(*Continued from page* 42.)

It is, I believe, to neglected anæmia and consequent malnutrition during the rapid growth period in girls that we must attribute much of the invalidism and debility from which grown women suffer. That state of things opens the door to tuberculosis and prepares the soil for many other maladies. But where there is no anæmia the state of the blood in the growth period in girls is a danger signal that deserves close attention. As I have shown, it is at that time in healthy normal girls enriched, so that there is circulating in their slight frames blood of adult male strength. The condition of the girl is then katabolic prior to her settling down into the anabolism proper to her sex. Her nervous system is in a state of erethism, and undue stimulation of it, and abridgment of the quietude and rest it requires, while passing through this phase is not unlikely to sow the seeds of morbid nervous manifestations later on. The roots of neurasthenia in women may often be traced to the time when the red blood corpuscles were in the ascendant.

I have been speaking of the significance of differences in the composition of the blood in relation to brain function, but there is another question bearing on blood supply, that is well deserving of consideration in connection with child study and the evolution of sex, and that is its distribution in the brain. Are all parts of the brain equally well supplied with blood, or are certain parts of it better irrigated than others, and is the system of irrigation the same throughout life? Are male and female brains equally well flushed with blood? In order to obtain an answer to the latter questions, Dr. Sydney Martin, F.R.S., some years ago, at my request, made a number of measurements by a

new method of the great arteries that carry blood to the brain. These arteries are, as I dare say you know, four in number, two internal carotids in front and two vertebrals behind, and these were measured at the point where they enter the cranial cavity immediately after passing through the skull and its outer membrane the dura mater. Dr. Martin found that the diameters of these four vessels taken together are slightly greater in the male than in the female. Their combined diameter was 8·2 mm. in the male, and 8·0 mm. in the female, but when the difference in size of the male and female brain is taken into account it was found that in proportion to brain weight their conjoint diameter is greater in the female than in the male, and so it appears that upon the whole the female brain receives as large, perhaps a slightly larger, supply of blood in proportion to its mass than does the male brain. But further it was found that the internal carotid and vertebral arteries, when their measurements were taken separately, displayed a marked difference in calibre in male and female brains respectively. In ten brains of male adults, free from brain disease, and from twenty-five to thirty-six years of age, the internal carotid arteries had an average diameter of 2·8 mm. on the right side, and 2·75 mm. on the left, while the vertebral arteries had an average diameter of 2·2 mm. on the right side, and 1·875 on the left; whereas in ten brains of adult females free from brain disease, and from twenty-five to forty-three years of age, the internal carotids had an average diameter of 2·6 on both sides, while the vertebrals had an average diameter of 2·3 mm. on the right side, and 2·075 on the left. It would thus appear that the distribution of arterial blood in the male and female brain differs to some slight extent. The internal carotids with their branches, the anterior and middle cerebral arteries, the great conduits to the fore and middle brain, are larger both absolutely and relatively in the male than in the female brain, but the vertebral arteries which minister to the occipital region are larger in the female than in the male brain, while again the basilar artery, which is practically a continuation of the vertebrals, is also larger in the female brain, where its average diameter is 2·8, than in the male brain, where it is 2·6.

There is no doubt a wonderful system of anastomosis, known as the circle of Willis, at the base of the brain, by which its circulation is protected from the possibility of interruption by the accidental closure of one or more of its arteries, and it might be thought that this rendered comparatively unimportant differences of calibre in the carotid and vertebral arteries, and must equalize the blood current in the different regions of the brain. But the fact is that the posterior communicating arteries which, when dilated after any pathological obstruction on the

cardiac side of the circle of Willis, maintain the circulation in the brain in tolerable integrity, are incapable while normal of adjusting the balance between the direct currents of the carotid and vertebral arteries, and so it appears that the arterial blood supply is somewhat larger in the anterior region of the brain in men, and in the posterior region in women. But these two regions of the brain are differentiated in function. The anterior region, comprising the frontal and parietal lobes and island of Reit, which in man receives the larger arterial supply, includes, speaking generally, the motor area, the speech centre, the higher inhibitory centres, and the association centres concerned in appetites and desires based upon internal sensations, while the posterior region, made up of the occipital and temporo-sphenoidal lobes, which in woman receives the larger arterial supply, is mainly sensory, and concerned with visual and auditory sensations. Vascular supply is invariably, in some degree, a measure of functional activity, the flow of blood having always some proportion with working power, and it is easy to see some correspondence between the richer vascular supply of the posterior region of the brain in women, and their delicate powers of sensuous perception, rapidity of thought, and emotional sensibility, and between the richer vascular supply of the anterior region of the brain in men and their greater originality on the higher levels of intellectual work, their calmer judgment, and more powerful volition. Romanes showed by his experiments that women can read much faster than men—the general belief is that they can talk faster—and that man has more decision of character.

It would be interesting to determine whether the vascular supply of the different regions of the brain is always the same, or varies at different periods of life; and a series of observations on the cross sectional areas of the cerebral arteries at different ages would be instructive. According to Landois, the child begins life with blood-vessels which are larger relatively to the heart than at adolescence. At birth the numerical ratio is given as 25 : 20, but at fifteen years of age it is 50 : 140, and in adults 290 : 61. This striking increase indicates that the work of the heart is relatively less in early life, and it implies that the blood-pressure also is lower at that age.

I have been dealing with certain physical measurements in connection with child study and youth study and brain-function, and I would turn for a little, if you will allow me, to certain psychical measurements, which are, I think, of much promise in child study, and which must prove useful in the recognition and classification of the feeble-minded.

The Report on the Royal Commission on the Care and Control of

the Feeble-minded, although it has not yet led to legislation, and although its ambitious projects are never likely to be fully realized, has yet already had a very salutary effect by directing public attention to the question, and by setting in motion a number of subsidiary inquiries, which have cleared up difficulties and prepared the way for remedial measures, and indeed in some instances secured them. Following upon that report, the medical inspection of school children is gradually supplying trustworthy information as to defectives of all kinds, and it thus providing us with a sound foundation upon which preventive and remedial measures may be built up. No general anthropometric survey of the children of the country is yet possible, but inspection, as far as it has gone, reveals a state of matters that is well calculated to create anxiety. We are told that of the six million children in the elementary schools of England and Wales, ten per cent. suffer from serious defect of vision, three to five per cent. from defective hearing, one to three per cent. from suppurating ears, eight per cent. from pronounced adenoids or enlarged tonsils, twenty to forty per cent. from extensive and injurious decay of the teeth, one per cent. from recognizable tuberculosis, and from one to two per cent. from heart disease. A percentage of children, ranging from 3·5 in one district to 26·9 in another, suffer from malnutrition, due to poverty, intestinal parasites, oral sepsis, rickets, or other causes, and are anæmic with a deficiency of red corpuscles in the blood, thin and under-sized. There are also a certain percentage of children who are physically defective, crippled, or epileptic, and altogether Dr. G. R. Kayes' calculation that there are at the present time 4,800,000 children who are unsound in body or mind seems to be well warranted.

As regards feeble-mindedness, it is interesting to note that the returns received by the Board of Education agree closely with the estimates of the Royal Commission, based upon examination in a few typical areas only. Following the data of the medical investigators, the Commission concluded that, in England and Wales, the number of mentally deficient children may be expected to be, in the areas urban and rural, 0·79 per cent. of the number of children on the school register, falling as low as 0·28 in a northern colliery district, and rising to as high as 1·12 and 1·24 in urban areas. Generally speaking, therefore, the percentage of feeble-minded children in any community varies from 0·25 to upwards of 1 per cent. This would yield a total number of feeble-minded children on the school registers of between 15,000 and 16,000. It is almost certain, therefore, that the estimates of the Royal Commission have been proved by the statutory medical inspection of school children in every part of the country, both in 1909 and 1910,

to be approximately correct. They estimated that there were 150,000 feeble-minded persons in England and Wales, of whom 48,000 were children in public elementary schools.

As regards feeble-minded children, the local education authorities are now in possession of information as to their number and condition, which should lead to their proper classification, and to the provision of suitable education. And the important point is that the education provided should be suitable, and have regard to the limitations and prospects of improvement of those for whom it is devised. The danger is that the education provided for the weak-minded will involve an outlay out of all proportion to the benefits which can possibly accrue from it. Owing to their helplessness, the education of the weak-minded always must cost more than that of the normal child, but humanity is inclined to lavish on them more than is really necessary, and it is deplorable to think that large sums are expended on the education of some of the feeble-minded who are ineducable, while other children of average intelligence, who would profit by education, are being reduced to feeblemindedness by poverty and malnutrition.

There are large numbers of the feeble-minded whose mental defect is irremediable and upon them costly educational energy should not be thrown away. There are large numbers who may be mentally strengthened up to a point, and who should have the benefit of such education as will make them harmless and practically useful. There are large numbers of backward children, who may be brought up to toe the line of average intelligence and who are entitled to ungrudging educational advantages, and beyond them there are large numbers of children not feeble-minded, not strictly speaking backward, but in various ways mentally abnormal, who are above all deserving of educational attention, combined with medical guidance, for they may be rescued from their abnormality, but if left to drift will go to recruit the various classes of degenerates who burden and afflict our civilization.

Children of this latter group, although perturbing many homes and well known to teachers whom they puzzle and harass, have not yet been made the subject of systematic study in this country, but in the United States they have been carefully observed and classified. They are there known as atypical or exceptional children, and are distinguished from abnormal children, including cretins, idiots and imbeciles of different types, and subnormal children, including epileptics, blind, deaf and dumb, deformed, paralytic and crippled children, and children suffering from arrested development and distinct mental defect.

The atypical children are of many different types, and present many

abnormal psychical traits. Amongst them we find children of morbid imaginative tendencies and lack of emotional poise, hysterical children, children with fears and obsessions, children without power of concentration, children without moral sense, children without will power, children with muscular tricks and tremors, children with trophic and vaso-motor disturbances. Children of any of these classes, whose atypical condition is due to neglect or adverse environmental influence, may, if left untreated, drop down into lower classes in the scale of development, may lose such normal characteristics as they possess, and degenerate into permanent defectives. It is a question of potentials and their direction. On the other hand, having the normal potentials, atypical children may be restored to normal equilibrium.

(*To be concluded.*)

MENTAL HYGIENE IN RELATION TO THE DEVELOPMENT OF THE CHILD.

By THEO. B. HYSLOP, M.D., F.R.S.E.

A Paper read at the Conference of the Child-Study Society, held in the University of London, May 11, 1912.

Some years ago there had been growing upon the people the conviction that we were not, as a race, so fit physically and mentally as we had believed ourselves to be, and, as is usual in such instances, the matter was referred to the consideration of the medical faculty. As the outcome, we had the report of the Interdepartmental Committee on Physical Deterioration, which report placed before us the problem of how to meet a symptom of more grave import than any question of poverty; and one of the remedies suggested was that of teaching the children how best to live.

On July 11, 1904, the medical profession of the kingdom approached the Board of Education by deputation to Lord Londonderry, and presented a petition, signed by upwards of 15,000 members of the profession, asking that hygiene and temperance should be placed among the compulsory subjects of elementary education. The reasons for making this advance in social instruction were briefly summarized in the petition of the profession, and were warmly approved and supported by the press throughout the whole kingdom, and their cogency was admitted by the Board of Education. The proposition of the medical profession was that the list of subjects in the code of the Board of Education for Public Elementary Schools should include hygiene and temperance.

They also issued a draft syllabus of instruction in the subjects, based on the methods already in operation in our colonies and army schools, in America, Sweden, Holland, Denmark, etc. At the same time they urged the necessity of giving the subject of temperance a prominent position.

The next step towards the promotion of the scheme took place at a well-attended conference of members of the medical profession, held at the Examination Hall, Victoria Embankment, on March 25, 1905. The late Sir William Broadbent, who presided, said that movement was initiated by a memorial signed by nearly 15,000 medical practitioners, followed by a largely attended deputation to Lord Londonderry, who, while expressing sympathy, showed that the teachers in elementary schools were not as yet qualified to give instruction in hygiene. The training of teachers and the provision of suitable books were, therefore, the first questions to be considered. Of the necessity for the inclusion of hygiene and temperance in the subjects to be taught in schools there could be no doubt. The State had undertaken the education of the children of the poorer classes, and had made attendance at school compulsory. It was, therefore, the duty of the local education authorities, to which this task had been delegated, to make the education given in the schools under their control efficient; and to be efficient the education must be such as would fit the children for earning their living and also influence their character for good. If there was one thing more necessary for that end than another, it was health, and with regard to that the parents of these children were, for the most part, at once ignorant and careless.

Following closely upon this, representatives of the National Union of Teachers and the medical profession held a joint and private conference in London on June 6, of the same year; and many valuable observations, both for and against the scheme, were made. The executive of the National Union of Teachers passed a resolution to the effect that, having regard to the present crowded condition of the curriculum and to the impossibility of omitting any of the subjects for which, in public opinion, importance is properly claimed, they did not consider the adoption of the scheme to be practicable. They also thought the advocacy of total abstinence would not prove acceptable to certain classes of parents, rate-payers, and local educational authorities.

With regard to the latter objection, it was to be deplored, not answered. The implied increase of work for the children is, however, worthy of some consideration, but I agree with Dr. Kenwood, the Professor of Public Health at University College, that this is not an insuperable difficulty; and since then, the Board of Education has not only appointed medical men as advisers, but it has also issued a careful

and detailed syllabus on the teaching of hygiene and temperance, and needless to say, this is more than half the battle gained.

Surrounded as we are by reports of the existence of physical and mental deterioration, it seems right and fitting that the country should be fully alive to all questions affecting the welfare of its people, and with this awakening to the necessity for, and the probability of, improving the national physique, I am in complete sympathy. But as a member of the medical profession, and as one who has to do mainly with the mental aspects of the people, I am alive to the dangers of adding to our burdens of education; and, more important still, to the dangers of cultivating a knowledge of self which is apt to lead to unnecessary timidity and a train of evils which are far-reaching in effects. There is no doubt whatsoever but that we are as a nation becoming extraordinarily solicitous as to our own bodily welfare. In times gone by, the Anglo-Saxon was characterized by his hardihood, by the simplicity of his life, and by his mental and physical vigour. How many people nowadays, when they rise in the morning, omit to examine themselves in the looking-glass in order to satisfy themselves that they have a look of health? They are usually so fully conversant with the symptoms of ill-health that at the slightest indication of a bilious hue of conjunctiva, furring of the tongue, or a general feeling of anergia, they run to the cupboard near at hand, and resort to the use of one of the numerous remedies which they have assiduously accumulated.

When we turn to our morning paper we find all the latest quotations on uric acid, bile, and tremours, and whole columns of proofs as to the infallibility of certain nostrums. Wherever we go, and whatever we read, we cannot escape from the melancholy details of symptoms of disease set forth in large type for our especial edification. No wonder is it, therefore, that all sorts of quackeries and impostures have increased by such leaps and bounds that the amount expended upon their consumption is enormous. From my experience of life as a physician, I believe the people to be, as a whole, absurdly timid; and *it is to the acquisition of a pseudo-knowledge of their own bodily functions that they are almost afraid to live.* It is needless to say, therefore, that I am not in sympathy with any teaching which is not wisely and temperately directed.

In making this statement I of course refer to the amount to be taught to the children. The amount of instruction essential or advisable for the instructors is quite another matter.

It is true that "the hand that rocks the cradle rules the world." Woman, instead of being a mere breeding machine, in antithesis to man as a working machine, stands at the summit of the propelling forces

which lead to evolution or devolution of our race. To woman is accorded by nature the responsibility of giving birth to the highest evolved manifestations of nature, namely, human life. Upon her rests the care of moulding the young and growing spirit which obtains its trend not only from its mother's influence and example, but also through the subtle laws of heredity. The earliest years of life are fraught with the tenderest recollections, and to the mother's influence can be traced the formation of *habits* of conduct and of conscience which persist throughout life, and which can never be excelled by the later teachings of any system of moral philosophy or even of religion.

To heredity and to the early years of parental influence I would ascribe the greatest power for good or ill in the establishment of health and character.

The subsequent unfolding of the mental faculties will follow in due course. It has been said by many notable people that they themselves were not constituted to be criminals owing to heredity and to the fact than when they departed from the dictates of habit they suffered torture. Thus habit becomes not only one's own law and compels one to be true to one's self, but it is also one's own executioner. This means, philosophically, that habit, as such, imposes restrictions and punishments which may be observed and feared respectively. It is needless to say that the fundamental laws of truth, faith, hope, and charity, combined with all that goes to make up what is known as justice and lovingkindness, are in childhood better instilled and infinitely more lasting than are any later teachings or legal restrictions.

The same holds good with regard to the habits of mental and physical health. It is not so much to knowledge as to *habit* that we should pay attention in the early years. A little knowledge is a dangerous thing, but the cultivation of a good habit is an insurance against danger. To mothers, therefore, are given the opportunities of imparting habits of mind and body which far exceed in power the influence of Church, State, or medicine.

The habits of cleanliness, performance of bodily functions, temperance in eating and drinking, and all the various factors which are comprised under the term "hygiene" should be part of the *development* of the child, and *none of these elementary conditions should require or necessitate the displacement of any of the subjects now taught in schools.* In order, however, that this should be carried out effectually, it is absolutely necessary that teachers should have definite and reliable information upon the subject of hygiene.

When children have reached the age of twelve or thirteen years it may be necessary to supplement or even displace some part of their

instruction by giving them class-room demonstrations of hygiene and temperance.

I have already in my remarks on the prevalence of degeneration led up to the questions: (1) At this stage of our history has education or book knowledge in itself effected what it was designed to do? (2) Which is really of primary importance to the nation, education as we now know it, or mental and physical health? The answer is to me very definite, and I say that the time has come when we ought to bring our united strength to bear upon this problem of health. It is a more urgent need than that which existed in 1870, and it rests with those in authority to face the music and decide whether they will give way to necessity or pursue a policy which can only help on to disaster.

Manifestations of the Unstable Brain.—Dr. Hughlings Jackson, that pioneer of thought pertaining to evolution and dissolution of the nervous system and the mind, has clearly pointed out that there are two factors for consideration in every form of degeneration, viz. the faulty construction, and the inability to perceive the faultiness of the construction. In the insane, the incoherent nonsense, the hallucinations, the delusions, and the irrelevancy of conduct are all in themselves positive symptoms due to false constructions; but they are of comparative insignificance as compared with the factor of disease or defect which prevents the individual from *knowing* their falsity. Owing to the conglomeration of barren facts in the memory of the individual, to the imperfect development of the various paths of recall, and to the want of systematic organization of the reasoning processes which serve to digest and combine the facts into a coherent whole, the minds of the present generation are unstable, easily upset, and prone to fail when any degree of strain is put upon them. As it is with an individual, so it is with a nation; when deterioration sets in, it manifests itself first in impairment of the highest evolved, most recent, and therefore least stable of its acquisitions. The brain of the nation is now taxed to excess, and it is the brain of the nation that is showing such formidable signs of decay. The positive symptoms of apparent progress are of little diagnostic significance, except when compared with the evidence of a negative lesion or enfeeblement which saps the foundations of all that is forcible and effective in the vitality of a nation.

I now maintain that our educational system of endeavouring to force all brains to a high standard of competency is not only in itself based upon a false principle of economy, comparable to flogging the already jaded horse, but the methods themselves are not only often useless and unprofitable, but actually deleterious. We all of us develop

our bodies by combination of efforts; this is development, as opposed to mere growth in bulk from the ingestion of food. Education, as we know it, however, strives mainly for the attainment of mere growth, and neglects the mental combinations which favour development. Selection is the very keel on which our mental ship is built, and so, in the building of a mind, selection is the one point of paramount importance.

Space will not permit me to follow step by step the development of the mind-complex. I merely state that all mental development, if it is to be rational, organized, stable, and able to resist the wear and tear of life, must be based upon the heaven-bestowed power of reasoning. Every combination should be fixed in the form of a syllogism. The logical faculty with which we start life should be cultivated, amplified, and corrected assiduously, until the processes of thinking correctly become so stable that no mere incidental stress or strain can possibly warp or overthrow them. It will readily be conceived that repetition, and all the farcical attempts to cultivate mere memory, result in nothing more than an unstable growth or deposit. From defects and false combinations of these deposits, we get positive symptoms which, however, would not amount to insanity were the reasoning power still maintained. It is, therefore, to the development of the reasoning power, and to that mainly, that true lasting power of mind is to be traced.

Now, not only does repetition by rote and cramming the memory with useless material take up much of the available time of our children, it also saps their energies by waste of effort, and does much to retard the sound organization or combination of brain activities. Logic and the power of reasoning is only too often delayed or given merely as a top-dressing in the cultivation of the intellect; and, as the most recent and least stable of the acquisitions, it is therefore the first to degenerate. This is absolutely true, not only of the individual, but also of our race. What we are losing by instinct we are supposed to be gaining by reason; but, alas! our so-called "reason" is on the verge of a reversion.

The last problem to which I shall refer is one which requires very careful and delicate handling. My experience as a physician is that in every normal person there exists a reproductive system which has its phases of evolution and various psychological and physiological phenomena. Unfortunately ignorance of sexual functions and the absence of timely warnings as to their proper control, etc., have proved to be the origin of life-long troubles to many. It is always a grave problem to the schoolmaster and to the parent as to how much instruction in these matters should be imparted to children. I, for my part, believe that some instruction and guidance given by medical men to the senior pupils of schools would be of benefit, not only to these pupils themselves,

but the precepts would permeate throughout the younger classes and save much of that which leads to deplorable results both in the individual and in the race.

THE EXPERIMENTAL STUDY OF MEMORY.

By BEATRICE EDGELL, M.A., Ph.D.

A Lecture given before the London Child-Study Society, March 28, 1912.

Before speaking of the experimental study of memory it may be well to preface what is here understood by the term "memory." The word is often used in a very wide sense as the synonym of "retention," the influence of past experience on the present. It was memory in this broad sense which Prof. Hering claimed as "the universal function of all organized matter." Wherever there is life with growth and development, there he would predicate memory, since every new process is the outcome of the old, every increase is built out of what has gone before and implies its retention.

This is memory in what one may term the "biological" sense of the word. Our whole life is witness to it. Nowhere is it more evident than in the phenomenon of "habit" or again in that of "practice." That successive repetitions of an action should render this action so easy, its performance so mechanical whenever occasion arises, that often there is no conscious realization of it on the part of the agent, this would be impossible were it not that each occasion leaves what we call its "trace" behind, *i.e.* is retained. Similarly, the advance in skill or facility of any kind which we call "practice" implies that the effects of past efforts persist and that each new effort is re-enforced by the effects of the old. Were it not so, practice could never make perfect. Memory, as it is used in the title of this paper, does not stand for the fundamental principle of retention, but for a much more restricted fact of conscious experience, viz. the reference back to past experience, as past. Experience is not merely retained, but reproduced with the consciousness that it belongs to the past. To remember means to refer back. It may be an actual re-experiencing of the past as in reminiscence, or it may be the conscious interpretation of the present by the light of the past.

It is convenient to distinguish Immediate Memory from Mediate Memory or Suggested Recall. In the former a re-experiencing takes place immediately after the experiencing, *e.g.* at the play one may close one's eyes and see again the scene upon which the curtain has just fallen, or after the last notes of a song one may hear again the singer's

voice singing the closing words. Mediate Memory or Suggested Recall is the form of memory with which we are most familiar. Something in the present suggests the past, either in that it serves as an incentive for re-experience or in that it requires a conscious recall of the past to enable us to deal with it, to explain or act upon the given. Different from either is the experience termed Persistence. It is unlike Suggested Recall in that the reproduced ideas come unbidden, *à propos* of nothing in present consciousness. It is unlike Immediate Memory in that the ideas do not arise at once at the close of some experience, but some little time afterwards, usually when there is no special task or interest engaging consciousness, *e.g.* when we go to bed and fain would sleep. Every one, I suppose, knows what it is to be haunted by a tune, to hear over again scraps of conversation in which one has taken part, to see slides or charts with which one has been occupied during the day.

The experimental study of memory may be described as a study of the conditions of retention and reproduction of past experience in any of these forms. I cannot give an adequate account of such a big field of research, but I have tried to select some of the topics which I hope may prove of greatest interest.

I. Economical Learning.—The study of the problem of Economical Learning has been pursued in different directions, *e.g.*—

(A) *Method of Learning.*—Given a certain amount of material which has to be committed to memory, what is the best way of attacking it? This question was first taken up by Miss Steffens in Prof. Müller's laboratory at Göttingen, the laboratory to which we owe many important researches concerning memory. Like other problems this one had been suggested by Ebbinghaus' work "Ueber das Gedächtnis" (1885). Miss Steffens set seven grown-up persons the task of learning poetry, Byron's "Childe Harold." This poetry each person learnt as he pleased, saying it aloud in Miss Steffen's presence, in order that she might take note of how it was learnt. She tried the same experiment with a boy and a girl. Although each person had his or her individual peculiarities in learning, there were certain general points of agreement. Every one broke up the nine-lined stanza into parts; in learning a new part every one went back from time to time and repeated the part or parts already learnt. Every one gave far more repetitions to the earlier lines than to any subsequent portion. Difficult bits were picked out and given special repetition. Miss Steffens also noticed that the adults learnt by trying to say what they knew and correcting the mistakes, whereas the children were content to go on repeating and repeating from the text.

Choosing other stanzas which were as far as possible of equal

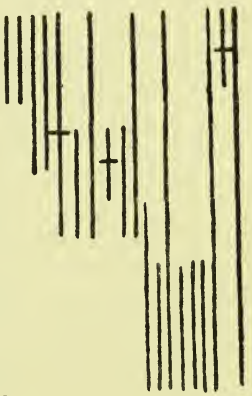
difficulty with the first, Miss Steffens then set her subjects to learn according to a prescribed method. Each stanza was to be read through as a whole, and repeated from beginning to end without any attempt at breaking it into parts or any selection of difficult bits. To their surprise the subjects found that they learnt more quickly when following out this method than when following their own devices. The average time for a stanza learnt by the method was 2 minutes 47 seconds as against 3 minutes 3 seconds. The same procedure was carried out with nonsense material, with the same result. By nonsense material is meant series of syllables, each consisting of an initial and a final consonant with a middle vowel, so chosen that no one syllable stands for any word, and so arranged that no word is formed by their combination, *e.g.* tac-lil-sof-neb, etc. This material has been used very largely in memory experiments, since it possesses the advantage of being free from helping or hindering associations, and of being sufficiently uniform in character to allow comparison of the result of one experiment with that of another, a comparison which is difficult when working with the material usually committed to memory. For instance, in Miss Steffan's experiments it might be easy to say that the superiority of the second results over the first was due to the fact that the stanzas learnt by the method were easier than those learnt without it. This method of learning is known as the Global method or the "G" method, learning by wholes (German, *Ganze*), as distinguished from the piecemeal learning of common practice, called the "T" method (German, *Teil*).

The results obtained by Miss Steffens have been confirmed by other investigators, by Miss Ephrussi and by Meumann and Ebert, who have made extensive experiments with school-children. It has been shown that the economy of the method lies not only in the saving of time during learning, but also in the more enduring character of the resultant. There are psychological reasons why the "G" method should be the more economical one: (1) The learning is assisted by the mind having before it the whole as a whole,—if the material is sense, the logical relations of part to part will aid in forming the necessary associations; (2) attention in learning moves forward from point to point, following the same order which it will be required to follow in reproduction; (3) unnecessary associations are avoided. In piecemeal learning the beginning and end of each section are associated together through repetition, although this relation is quite unnecessary for subsequent reproduction. Dr. H. J. Watt, in his little book on memory ("The Economy and Training of Memory"), says that in learning 100 lines of Pope in couplets, 198 associations would be formed, of which only 100 are necessary for reproduction.

The practical value of the "G" method is very great, but it is important to notice the circumstances under which it requires modification. Miss Ephrussi found that when the matter to be learnt was unfamiliar, the subject learnt more quickly by the "T" method; the subject becomes more readily at home with the material by the successive repetitions of each piece than by the repetition of the whole. Again, if a piece is uneven in difficulty, it is advisable to stop the repetition of the whole when the learning has proceeded some way, and to give special repetitions to the points of difficulty, and then to resume the "G" method. Lastly, if the matter to be learnt is long, it is impossible to go through the whole with unflagging attention. A pause should be taken at any convenient point, so that in reading through the whole, rest at this point will allow attention to be readjusted, and concentrated afresh for the remainder of the task. The following tables will serve to illustrate some of the results of the "G" and "T" methods:—

TABLE I.—UNCONTROLLED LEARNING IN PARTS (STEFFENS).*

To horse! To horse! he quits, for ever quits	1.
A scene of peace, though soothing to his soul:	2.
Again he rouses from his moping fits,	3.
But seeks not now the harlot *and the bowl.*	4.
Onward he flies, *nor fixed as yet the goal*	5
Where he shall rest him on his pilgrimage;	6
And o'er him many changing scenes must roll,	7
Ere toil his thirst for travel can assuage,	8.
Or he shall calm his breast, or learn experience sage.	9.



"Childe Harold," I. 28.

TABLE II.—AVERAGE NUMBER OF REPETITIONS WITH "G" AND "T" METHODS (MEUMANN).†

Subject.	"T" method.	"G" method.
8 year old boy	17 rep.	11 rep.
	15 ,,	10 ,,
(Goethe's "Erlkönig," 1 verse.)		
Adult	33 rep.	14 rep.
(Schiller's "Dido," 2 verses.)		

* Steffens, "Exper. Beiträge zur Lehre v. ökonomischen Lernen," *Zeitschr. f. Psychol. d. S.*, Bd. xxii., 1900, p. 324.

† Meumann, "Ökonomie u. Technik des Gedächtnisses," pp. 198, 203.

TABLE III.—COMPARISON OF "G" AND "T" METHODS WITH "UNFAMILIAR" MATERIAL (EPHRUSSI).*

Subject.	"T" method. No. of Right Answers.	"G" method. No. of Right Answers.
S.	25%	15%
W.	25%	13%
(18 pairs of Russian words, with German equivalents. 16 repetitions.)		
K.	64%	44%
(12 pairs. 9 repetitions.)		
K.	(*a*) 47% (*b*) 37%	36%
(8 pairs (*a*) repeated 2 at a time ; (*b*) repeated 4 at a time.) 9 repetitions.		

TABLE IV.—COMPARISON OF "G" AND "T" METHODS WITH "FAMILIAR" MATERIAL (EPHRUSSI).

Subject.	"T" method. No. of Right Answers.	"G" method. No. of Right Answers.
M.	61%	77%
(8 pairs of German words and numbers, 12 repetitions, 8 experiments.)		
C.	30%	45%
(8 pairs, 12 repetitions, 8 experiments.)		
S.	42%	38%
(8 pairs, 12 repetitions, 12 experiments.)		
	58%	64%
(8 pairs, 12 repetitions, 12 × 2 experiments.)		
	41%	47%
(8 pairs, 6 repetitions, 8 × 2 experiments.)		

(B) *Distribution of Repetitions.*—This is another investigation which was suggested by the results noted in Ebbinghaus' treatise. Given that x repetitions are used to learn certain material, how should those repetitions be arranged? Shall they all be taken at one time, or shall they be spread out as much as possible? Adolf Jost worked at this question under Professor Müller, and his conclusions have proved of great practical value. He found that the greater the interval over which the repetitions could be spread, the more effective the repetitions proved.

His experiments led him to formulate two hypotheses as to the "ageing" of memory ideas. (*a*) That if two associations are of equal strength but of different age, a renewal has more effect on the elder than the younger ; (*b*) that if two associations are of equal strength but of different age, lapse of time affects the elder less than the younger.

* Ephrussi, "Exper. Beiträge zur Lehre v. Gedächtnis," *Zeitschr. f. Psychol. d. S.*, Bd. xxxvii., 1905, pp. 86, 87.

TABLE V.—PROGRESS OF FORGETTING IN THIRTY DAYS. RAPID AT FIRST, SLOW LATER. FOUR GROUPS OF SUBJECTS (HENDERSON).*

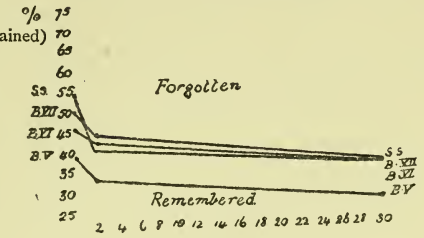


TABLE VI.—COMPARISON OF THREE DISTRIBUTIONS OF TWENTY-FOUR REPETITIONS (JOST).†

Subject.	Kind of series.	Number of Right Answers.	Time of response.
B.	8 rep. on	18	2496σ
M.	3 days.	7	2429
B.	4 rep. on	39	2213
M.	6 days.	31	1570
B.	2 rep. on	53	2007
M.	12 days.	55	1675

The table shows results with what is known as the "Scoring Method." Each subject learnt six series of twelve syllables according to each type of distribution. The syllables were learnt in trochaic rhythm. In the test the subject was shown a stressed, and asked to respond with the following unstressed syllable. The interval between the exhibition of the stressed syllable and the subjects' response was recorded by means of a Hipp chronoscope, which shows thousanths of a second (σ). The hands of this clock can be set in motion through the closing or breaking of an electromagnetic circuit, and can be arrested in the same way. The circuit was so arranged that it was broken as each syllable came into view, and as the subject responded, the movement of his jaw reclosed the circuit by means of a lip key. The readiness or tardiness with which the subject supplies the following syllable has been found to be a valuable index of the strength of his associations. Reference to the table will show that the average time of response decreases with greater spread in the distribution of repetitions.

(*To be continued.*)

* Henderson, Monograph, Supplement V., *Psychological Review.*

† Jost, "Die Assoziations festigkeit in ihrer Abhängigkeit v. d. Verteilung d. Wiederholungen," *Zeitschr. f. Psychol. d. S.*, Bd. xiv., 1897, p. 452.

ADOLESCENCE.

By Sir THOMAS CLOUSTON, M.D., LL.D.

(*Continued from page* 8.)

If we turn now from the merely anatomical view of the brain cell to its functional activity during adolescence, we find ourselves on much surer ground. From birth up to puberty there has been a continuous development of the co-ordination of muscular movements with the action of the brain cell. This co-ordination has been steadily developing, but is yet far from being perfect. The boy and girl have learned to play games, to draw, to paint, and to play musical instruments, but all those have not usually attained a very high point. Golf, tennis, and cricket have not acquired absolute accuracy; painting and playing the piano have not been able to express the ideals of feeling and soul. There is yet something wanting in all these co-ordinations. If the brain-vehicle of the higher feeling and the higher and subtler imagination has not arrived at perfection, it is obvious that it cannot manifest itself in perfect muscular expression. The educative process is still going on, and needs practice, guidance, and direction. The highest and most important hereditary tendencies for good or evil have not then exhibited themselves. The individual similarities, differences, and peculiarities have not then fully come out, and especially the higher sex differences have not appeared. The great function of reproduction has not come in to colour body and mind. It is then that we find the first appearance of certain hereditary nerve instabilities such as hysteria, neurasthenia, and mental disease. The strength and the qualifications to reproduce and rear the race then develop rapidly as adolescence advances. The higher intensities of feeling, imagination, and action, are then seen for the first time. Fancy is transformed into constructive imagination, sentiment then becomes really ideal and poetical. The higher morality and religion become possible because their brain vehicles are then provided. A taste for and appreciation of the higher kinds of literature then appear, and slowly grow if the proper pabulum for them is provided. A more intense consciousness of self, a larger ambition, a pronounced altruism are then seen. The longing for new discoveries and the efforts to attain them become a dominating impulse. Adventure in the man, and the protective instincts, sympathizing, nursing, mothering, and teaching, dominate the woman. Love between the sexes becomes the most intense of passions; the sense of right and wrong and of duty become an active principle. "Character," that complex

sum of all the faculties, is then being crystallized. The purposes of life are then shaped. Idealisms, peculiar to each sex, instead of being inchoate as they are in the boy and girl stage, then take definite and practical forms. Adolescence has always been a favourite hunting-ground and subject of study and depiction by the masters of fiction and the drama. We find in Shakespeare, Fielding, Thackeray, Dickens, Meredith, and George Eliot, perfect pictures of the period. Romeo, Tom Jones, Pendennis, Richard Feverel, Gwendolen, are all true to nature. "Richard gave up his companions, servile or antagonistic, he relinquished the material world to young Ralph and retired into himself, where he was going to be lord of kingdoms, where Beauty was his handmaid, and History his minister, and Time his ancient harper, and sweet Romance his bride; where he walked in a realm vaster and more gorgeous than the great Orient, peopled with the heroes that had been." David then goes out to slay Goliath. The beginning of this period is the true test of the capacity of the school teacher; its middle period, of the University professor; and its latest period, between eighteen and twenty-five, is the true measure of value of the social environment, of the professional training and of literature and religious teaching as formative influences. Whether a man or woman is to be a success in life depends on the innate quality of the brain cell, and the environments to which, during adolescence, it is subjected.

I may say here that when I use the word "environment" I employ it in the modern scientific sense of comprising everything outside a living being that has any relationship whatever to it. It includes in that way the air we breathe, the objects we see, the sounds we hear, the food we taste, the men and women who surround us, the books we read, the social atmosphere we live in; in fact, all things in the heaven above and the earth beneath which consciously or unconsciously affect us. It is manifest that as regards our modern civilized life and its conditions, the true test of whether they are tending towards a higher evolution is whether they are fitted to build up a human society better and more permanent than what has existed in the past. Standing still means going backwards. For this purpose it is evident we must look chiefly to an advancement of the higher moral and social qualities. In the past ages there has been plenty of fighting, outward struggles, and adventure. The keenest wits and the most intense efforts have been used to acquire new territory, to get the better of opponents, and to overcome outward opposition. Individualism has done its best to acquire power, to use for its own purposes and to keep down the inferior in body and mind. Political intrigue, Machiavellianism, and rude force have without scruple kept down the weak, the unfit, and the

uneducated. The lessons and examples, hitherto for the most part experienced by adolescence, have been in this direction. It is for the teachers and the society of the future to raise and to broaden those examples and lessons and to make them such that they shall become the permanent possession of humanity. Mere individual acquisitions may not be transmitted, although they have been of immense importance. It is the further permanent evolution of the higher races of man that we have now to strive to attain.

Heredity is too large a subject to treat of it in its scientific aspects in a paper of this kind, but we cannot omit consideration of general facts in regard to it. The opinion of some of the best known writers on heredity has lately been that personal experiences are not transmitted to posterity. No doubt this law applies in a general way, but I cannot see that the evolution of living beings in the past could possibly have taken place except through the hereditary transmission of higher qualities bodily and mental. There is rapidly rising up among us a new race of scientists who believe that the higher qualities of man can be made still higher through the rules and practice of the new science of Eugenics. Galton's studies in heredity in this direction cannot, in the future, be disregarded by scientific men. That science is founded on the assumption that those higher qualities can be transmitted and increased through the practice of the laws of heredity.

The theory of heredity as carefully elaborated by Weissman virtually excludes the effects of environment as transmissible qualities to posterity, but when we come to apply those principles to mental qualities and to the higher brain cell, most of us find them to be too mechanical. We are not much helped by Dr. Archdall Reid in his "Laws of Heredity"—important though that book is in many ways. Even Darwin's "Variations" and their effects do not somehow or other seem to explain the facts of mental heredity. Absolutely new and specialized qualities developed in an individual through his environment may not be transmissible to his posterity, but all the things we would like to see strengthened in mankind already exist in some form or other. They are not new things. Inhibition, altruism, moral sense, brain stability, the higher social instincts and the religious instinct already exist in nearly all men in some degree or other. What we want is their further development and universal diffusion among mankind. This strengthening and spreading is absolutely consistent with the hereditary laws laid down by Weissman, and with all the facts adduced by Archdall Reid, if the beginnings already exist. Modern science has clearly shown that, at all events in the lowest forms of life, environmental influences produce changes in the individuals that

are transmitted to posterity. The latest studies in heredity, as expounded by Hertwig, prove that, in some animals, at least, the germ plasm is not dissociated from the soma; that is, the body minus the germinal parts. He found that in certain animals every part of the body has germinal qualities, and so could reproduce the whole organism, germ and soma combined. No biologist denies that the soma, at all events, can be influenced in its essential characters by environment. The facts which we know as to barbaric races becoming mentally changed so that they take their places among the civilized part of humanity, as to the domestication of wild animals, as to the changes in the food instincts of animals when the supply of their ordinary food fails, and they are compelled in order to subsist to take to other kinds of food, this becoming hereditary in their descendants—all those facts point to environmental mental changes being transmitted to posterity. As Maudsley eloquently says, "The opinion that an elementary particle of a bodily unity, specialized for reproductive purposes, lives in physiological seclusion is directly contrary to the whole trend of scientific inquiry which goes to show that when one organ suffers or joys all the organs suffer or joy more or less with it, being members of one body and members one of another."

It is important in considering this all-important question of heredity to consider in detail the diverse influences that go towards the perfecting of a brain cell. Its primary quality is, as we have seen, its innate capacity to develop into higher and higher function from birth to maturity. The influences which so develop it may be summarized by the term "stimuli." If by heredity the brain is so constituted that it cannot respond to its proper stimuli, then we have resulting a condition of want of mind, of idiocy, irremediable and unalterable, no matter what stimuli it is subjected to. This is fortunately a rare condition, only occurring in about one in every eleven hundred of the population. The common stimuli to the nutrition of the brain cell are good food, air with an abundance of oxygen, muscular exercise, and a sufficient blood supply, with an efficient brain drainage system to remove at once the used-up and effete matter which by its metabolism it has produced. The other stimuli chiefly come through the senses—harmonious sights, sounds, tastes, and odours. The brain cell of normal heredity and constitution, if it has been in childhood deprived of those stimuli, as in the case of a child who is deaf and blind and speechless, remains undeveloped in function and its possessor is in a state of virtual idiocy. This was the case with Laura Bridgeman and Helen Keller, but both of these girls when their brain cells received the proper stimuli, in their cases though touch alone, underwent a rapid development so that they

became mentally acute and normal. It may be assumed in the case of every cell except that of the idiot, that, given the proper stimuli they will exhibit normal mind. The extent to which that mind may be developed cannot be determined in any case beforehand. After mental action is established thought and emotions become intense stimuli to further development.

In the discussion of this question of the development of the brain cell and its heredity we must take into account as a very important factor the conscious subjective feeling of pleasure or of organic satisfaction which all normal stimuli, all suitable environments, and all exercise of function, mental and moral, produce. This law may be put in two ways: all environments that are harmonious produce pleasure or organic satisfaction; or all pleasures or organic satisfactions are good for the brain cell. It is certainly true, with certain qualifications, that whatever gives us pleasure is good for us, or whatever gives us pain or dissatisfaction is bad for us. Educationalists of late years, taking advantage of those biological and psychological laws, have endeavoured to make educative processes agreeable and pleasure-giving. If this can be done consistently with thoroughness, there can be no doubt that it is the right method. The scholar who is educated in such a way that he is unhappy, irritated, resentful or uninterested, will certainly not make the progress that he would have done under opposite subjective conditions of feeling. The pessimist, the man who does not enjoy life, the man to whom "nothing matters," is usually in ill-health or has a bad heredity. This whole question of pleasure, joy, enthusiasm, keenness, is of tremendous importance during adolescence. Adolescence is abnormal by heredity or by environment if those conditions do not exist and act for good all during its course.

But it will naturally occur to many people at this point, if those principles you are laying down are correct, where does self-control come in? Does not its exercise, in many cases, imply dissatisfaction and interference with pleasure? Does its exercise really hurt or help the brain cell? If life is a continuous series of acts of self-denial, would that be a normal or healthy state of matters? The true reply to this question is that given by Spencer. All normal acts of inhibition, of self-denial, and of altruism, if the education has previously been of the right sort, *will give pleasure*, and pleasure of the very highest kind, through the after-satisfaction that acts of duty always produce; in fact, the way to attain *the very highest pleasures* and satisfaction is through such inhibitions and through them only. We must of course divide pleasures into various kinds and qualities. The pleasures of a good dinner, of sitting in the sunshine, of meeting a friend, and of

denying one's self a glass of wine to help a weak brother are all good of their several kinds, and are all stimuli to the higher brain cell. It is only when acts of inhibition are practised for no object whatever except to strengthen the faculty, in fact, when they are a mere mental gymnastic, that their frequent use may be questioned. Physical gymnastics always have the results of improved muscle, better appetite, richer blood, and better sleep. Inhibitory gymnastics, like fasting, self-denial with no objective results, etc., may even be harmful. The mental and moral gymnastics of an Indian fakir or a Simeon Stylites are in their essential meanings selfish and without any real moral benefit to the individual or to mankind. There are plenty of ways of developing the inhibitory faculty in the ordinary course of life without resorting to such methods which are in their essence pathological, for adolescence has, like the other epochs of life, its strong and weak points. Its strongest point is vividly put by Stanley Hall when he calls it "a new birth." Not only does the brain cell undergo a higher development and integration, but there is not a bodily organ or function, a sense perception, or a mental faculty that is not accentuated or changed in some way during adolescence. It may be said that up to adolescence a human being is developing animal, bodily, and, so far, lower qualities, common to mankind and the higher animals; while during its course the distinctively human and higher mental, moral, and social qualities come in and gradually reach perfection. It is not only a new birth but also a real "crisis" in life. The things learned in adolescence are more thoroughly learned than in boyhood, and are not forgotten. There is a plasticity, a hunger for knowledge, and an enthusiasm that are not seen at the other periods of life. Originalities of all sorts then show themselves. Genius, that rarest of all human qualities, then begins to be manifested.

But then adolescence has its weaknesses, its dangers, its failures, and its special diseases. This my professional opportunities and studies have given me more chances of observing than even its strong points. Though the abnormal in humanity is fortunately far less frequent than the normal, yet it is necessary to study it because it suggests precautions, counteractive measures, and what we call in medicine "prophylaxis." The pathological is sometimes only the physiological in excess, a study of the one throws light on the other. While hereditary strong points, such as those I have described, undoubtedly come out in adolescence, yet it is a fact, and a most important one to remember, that it is at this time that a great many hereditary weak points appear for the first time. A study of such diseases has shown me that certain nervous diseases are most apt to appear in childhood, certain others from seven or eight years of age up to fifteen, and certain others during

adolescence. It is during the adolescent period that hysteria, epilepsy, asthma, dipsomania, megrim, neurasthenia, and a form of mental disease which I call "adolescent insanity" are the most apt to appear. In addition to those which come within the category of marked disease, there are many minor pathological, mental and moral conditions which are first seen at that time of life. These consist chiefly of perversions of the moral sense, of volition, uncontrollable impulsiveness, tendencies to law-breaking and crime, unteachableness, stupidities, incompatibilities of temper, unfounded aversions to relations, frothy religionism, impracticabilities of all sorts, perverted sexual and reproductive instincts, morbid pessimism and melancholy, loss of the normal love of life, suicide with failures to preserve and protect life, morbid and dangerous ideas of adventure, abnormalities in the social instincts consisting either of exaggeration or paralysis, eccentricities, and all sorts of perverted and irregular directions taken by the religious instinct.

The chief difficulty in regard to this formidable list of adolescent dangers is to estimate their real significance. So many of them are exaggerations of the normal characteristics of the period that it is difficult to tell where the normal ends and the abnormal begins. To antagonize and treat some of them is a matter also of extreme difficulty but of the last importance. One important indication of whether those things are of the nature of disease is to examine closely the nervous heredity of the ancestry. We find it to be a law affecting such cases that a lesser nervous or mental defect or peculiarity in the fathers or mothers tends often to come out in the children in a more marked degree or a worse form if the marriages have not been counteractive. It is no doubt difficult for educationalists to get at the facts of heredity, and many of them would say that this is not specially their business. I think a way out of this difficulty will now be found through the intervention of the school doctor, and it is one of the many helps which that official will be to the teacher and to education. After defects of eye and ear, teeth and chests have been looked to, I think the mental condition of the scholar and his heredity must come in. I mean that not only apparent and obvious imbecility and backwardness will be looked for, but a more careful analysis will be made of the mental condition of our school children so that the minor and nascent defects will be detected. And here I would say that one of the duties of the school doctor of the future, to which no attention has been paid as yet, will be to find out not only the specially weak and defective among the children, but also to sort out the specially strong and effective. I can imagine it to be of great value for an enthusiastic teacher to be told by the school doctor, "Now, So-and-so has a first-rate heredity, is strong and resistive both in

body and mind, and has lots of staying power, so that you can apply any pressure you like without running any risk." It might help to break the dull uniformity of educational codes to have a recognized class of non-damagable brains, a kind of "fool-proof" class that will not suffer harm by any mode of treatment.

It is no doubt the duty of every intelligent teacher to ask the question in regard to every manifest defect or peculiarity, every persistent tendency to disobedience, to truancy, to disorder, or failure to fall into school routine, "Is this due to the brain condition of the child or to mere moral defect?" The same question should be asked by the teacher in the secondary schools and by the professor in the university in regard to those and other more subtle, mental, and nervous conditions. It is one of the most marked normal peculiarities of adolescence to exhibit a want of respect for law, a contempt for age, and a resistiveness to routine. Such law-breaking as ends in criminality is found by statistics steadily to increase from the age of twelve to twenty-five. Over eighty per cent. of all those indicted for first offences are under twenty-five, and, if our criminal statistics are correct, juvenile crime is on the increase in all civilized countries. That is what we might expect on psychological principles. The early stimulation of every human brain through compulsory education tends undoubtedly towards the premature development of this physiological lawlessness before the counteracting power of mental inhibition is evolved in the brain. This is a powerful reason why measures for educating control should go hand in hand with those for educating the intellect. It is a well-known fact that where there is a bad nervous or mental heredity, lawlessness is more apt to appear than in the adolescent with a normal heredity.

ALFRED BINET (1857–1911).

By Prof. ED. CLAPARÈDE.

Translated from the "Archives de Psychologie" *by the kind permission of the Editor and Author, Prof. Ed. Claparède, by* Mary Louch.

(*Continued from page* 24.)

But I cannot here review all Binet's works. His activity was so abundant, he took up so many different subjects, that an account of his work, at once chronological and systematic, is impossible. While absorbed in questions of mental aberration, he was making studies as deep as they were original on the psychology of art (*Le mystère de la*

peinture and *La Psychologie artistique de Tade Styka* (*An. ps.* 1909); *Rembrandt* (*An. ps.* 1910), on the nature of *emotion* (*An. ps.* 1910); and he was, moreover, finding time to write dramas, many of which were represented on the stage of the Grand-Guignol, at Paris. In 1905, at the very moment when he was working out his Scale of Intelligence, and when he appeared to be completely engrossed with the ministerial commission, in connection with which he went through the severe trials mentioned above, he yet had enough mental freedom to attack the most arduous problem of metaphysics, the old problem of soul and body (*L'âme et le corps* (Paris, 1905); *Esprit et Matière* (*Bul. Soc. fr. de philos.*, March, 1905); *Cerveau et pensée* (*Arch. de Psychol.*); *Pour la philosophie de la conscience* (*An. ps.* xii.)).

Binet never took up metaphysics, a study which he rather disdained, or which at any rate never arrested his attention, always directed hitherto towards facts of experience. But no one must say, "Fountain, I will not drink of thy water." One day the distinction between consciousness and matter presented itself to him and fascinated his intellect, which might have been supposed to be averse to the subtleties of epistemology. Our friend, it is true, had too much intelligence not to be able to estimate at first sight the limitations of a question, even of a question that he was attacking for the first time. He did not flatter himself that he was going to arrive at a complete and definite solution of this eternal mystery. But he hoped to simplify the data, by taking up a new standpoint. This standpoint was the one which the philosopher and physician, Mach, had adopted in his *Analyse der Empfindungen*. But Binet did not know that work. Like his Viennese predecessor, he thought that the phenomenal heterogeneity of mind and matter could be got rid of by considering the latter as a composite of sensations. From that time there was no longer an abyss to be bridged over in passing from matter to mind, and consequently parallelism became a useless hypothesis. But this point of view hardly does away with the difficulties; it merely displaces them. However great the ingenuity shown by Binet, he never succeeded in finding a point of view from which mind and body might merge into one; under one form or another their duality always cropped up anew. He himself confessed that "It is useless to shake up these two things together; they cannot be mixed any more than one can mix oil and water" (*Arch. de Psychol.*, vi. p. 25). However this may be, this attempt of Binet's is very curious, and one is filled with admiration for the tenacity with which he tried to solve this unsolvable enigma in the midst of so many other interests.

We had the pleasure of reckoning A. Binet among the collaborators

of the *Archives*, to which he contributed, in addition to the article already quoted, *Cerveau et pensée*, and two notes: one on *L'appréciation du temps* (*Arch.* ii.), the other on *Le grossissement provoqúe de l'écriture* (*Arch.* iv.).

In spite of their apparent diversity, Binet's many works form the links of one chain. The fundamental idea which originated them all is research into the signs of intelligence. It was intelligence, in reality, that Binet was probing when he studied fatigue, muscular strength, the discrimination of the points of the æsthesiometer, the variations of the capillary pulse, sanguinary pressure, the form of handwriting, the expression of the face or of the hand, the diameter of the skull, suggestibility. . . . But each time that he started on a new study, he grasped it with such mastery, that he made unsuspected problems rise out of it. Also many of the questions, which were for Binet simple stages on the road that he was travelling along, have appeared so important and so fertile in themselves that they in their turn have become centres of new research; and so it has become possible when considering the powerful branches to forget the tree from which they emanated. Thus the experiments in *suggestibility* engendered the whole of the *psychology of witness*; the study of the intellectual differences of his two daughters incidentally introduced the question of the *psychology of thought.* And this makes us at once understand why Binet did not explore exhaustively all the veins which he brought to light (more often than not it was the Germans who exploited them, as was notably the case in the psychology of witness); it was because these new questions, interesting as they might have been in themselves, were only incidental to the end which, without being apparent, Binet faithfully pursued.

If we try to pick out the principal traits of Binet's scientific personality, the characteristic which strikes us most is virtuosity; he was a virtuoso in work, a Paganini of psychology. Under his touch observations and experiments yielded all the sounds they were capable of giving. He was also profoundly original. Being too much occupied with his own work to be able to read much of the work of other people, he addressed himself to problems with a complete absence of prejudice and a freshness of vision eminently favourable to the discovery of new facts.

Another characteristic is his absolute independence of mind. Binet was not one of those who are afraid of compromising themselves. He thought rightly that the world of facts does not possess forbidden regions, and that everywhere traces of truth may be discovered, provided one is armed with method and prudence. Therefore he was not afraid to be the first to undertake the experimental control of graphology

(*Les révélations de l'écriture*, Paris, 1906), and even of chiromancy, which is in still worse repute (*Essai de chiromancie expérimentale* (*An. ps.* xiv.)).

It is also particularly characteristic of him that he followed the career of an experimental psychologist, and very brilliantly, without becoming, ever so little, a disciple of the German school. For Binet, although he read English fluently, did not know a word of German, and he knew nothing of the work beyond the Rhine except what he learnt by hearsay. In this respect his friend and pupil, Victor Henri, was at one time a valuable auxiliary. For all that, it is none the less true that, ignoring nearly all the German publications, he was able to approach psychological problems with a mind free from all those suggestions which, all unknown, often dominate and limit the thought of a great scholar.

The psychology of Binet contrasts, indeed, with the German psychology of fifteen or twenty years ago as being a psychology more athirst for concrete reality: it aims less at studying mind in general than minds in particular—individuals; it has to do more especially with the higher mental processes, with those which play a part in the realities of everyday life, without stopping short at sensations, which are for Binet's psychology only trifles on the threshold. Or if he does linger there, it is to find out how intelligence behaves with regard to them. To-day, everywhere, psychologists occupy themselves with these higher mental processes. This is due in great measure to Binet. I do not think I exaggerate when I say that he is one of those who have done most to direct contemporary psychology to questions of application, which are in the end the most important questions even for theoretical psychology, since they bring the psychologist face to face with real life, and thus oblige it to take account of the modifications that its complexity imposes on mental functions.

Neither did Binet inherit anything from French psychology. Before his time no one in France had carried out a genuine psychological experiment (I except, of course, experiments in hypnotism). To begin with, he was Charcot's pupil, but it was only within a very limited area that he worked under this master. Perhaps he was more affected by English influence. In certain ways he reminds one of Galton: his keen observation, curiosity as to individual peculiarities, the tendency to consider individuals in their natural surroundings rather than in a laboratory. . . . But Galton was more of an anthropologist and statistician than psychologist, and a comparison between the two could not long be sustained. In short, Binet appears to me to be a profoundly original personality, he is like no one but himself.

His scientific production, as we have seen, was considerable. He

had great facility for work. It was no trouble to him to write. On the contrary, it was an almost voluptuous delight to him. "One of my greatest pleasures," said he to me one day, "is to have before me a sheet of blank paper to fill up." Work cost him no effort; it was a natural function which developed as it were in play: "I work quite naturally, as a hen lays eggs," he declared.

This pleasure was found in the actual fact of giving out, of creation: a work once accomplished lost for him the greater part of its interest; and it even happened that he neglected to go to see one of his own theatrical pieces represented on the stage. Not often are authors found who are quite so free from infatuation.

Binet never did any teaching, his laboratory at the Sorbonne never being associated with any official course of study. Besides, his genius would with difficulty have accommodated itself to the sacrifice of time that courses of lessons, practical exercises, or the direction of pupils would have necessitated. His mind was too full of ideas, of plans for study and experiments to leave him the calm leisure necessary for the priesthood of teaching. He was a fine type of what Oswald would have called the "romantic" seeker, with "rapid reaction" (in opposition to the "classic" scholar, with slow reaction, the typical professor). Doubtless he could have done violence to himself, and, like so many others, preferred to the apparently more modest path of natural aptitude the glaring road leading to fortune and honour. But worldly success had no attraction whatever for Binet; in this respect he was a true sage (special sign: he was never decorated). But he was rewarded by his wisdom; for the modest pathway led him through fertile tracts, and, in view of the splendid harvest which Binet reaped, no one could regret that he did not give it up in order to run after easy but ephemeral successes. Also one would have to be very little of a psychologist and to care very little for the conquests of science to reproach Binet, as some have done, with having had no professorial ambition. Binet, moreover, never repulsed serious workers, whose collaboration he always gladly accepted: Victor Henri, Larguier, Simon, and many others, such as the numerous teachers of the *Société libre pour l'étude de l'enfant*, can bear witness. But it is true he was inexorable towards all those who he thought might be actuated by other motives than the search for truth. And as such people are rather numerous, one cannot be surprised that he should have made a few enemies.

Binet had no false self-respect. Not only did he claim no priority for himself, but, on the contrary, he went so far as to forget his own work and to congratulate an author on remarks which had been borrowed from himself. Once, however, he made a claim, but so

timidly: it was in connection with the name of "École de Wurzbourg," which was given to all the disciples of Külpe, who investigated thinking by a method of introspection carried out with intention, a method also adopted by Binet: "While giving all due credit to the excellent work which has been initiated by our excellent colleague at Wurzbourg," says he, "we make a small claim, and without insisting on purely personal reasons which make us protest against this attempt at annexation, we propose that the more equitable name of 'méthode de Paris' [Binet, *Année Psychol.*, xv., preface] shall be given to this method." In reality introspection, which Binet always considered an indispensable auxiliary to experiment, was applied to the study of thought simultaneously and independently by the psychologist of Paris and his German colleagues; but the latter have taken care to more explicitly lay down the principles of the method, so that the "École de Wurzbourg" has doubtless some good claim to advance (cf. Külpe, *Comptes rendus du Congrès de Psychologie de Genève*, 1909, p. 24).

This polemic interested Binet but little. The systematic vilification of an adversary fighting against the evidence of facts made him smile, for his sense of humour was great. Besides, he was a tender-hearted man, an affectionate and faithful friend; and with perfect modesty was combined a certain timidity and even a little shyness. Never could he be persuaded to take part in a Congress. And yet there were so many of our colleagues who would have liked for once at least to have made his personal acquaintance! For a long time he lived at Meudon in order to be quieter. In the summer he lived at Samois, near Fontainebleau; he owned a little country house there, and in recent years had allowed himself to be placed on the municipal council of the *commune*. He took very seriously his new civic duties in which he found a fresh interest; doubtless the psychology of the parish council offered new problems for his insatiable curiosity. He made use of the situation to initiate an inquiry of the highest interest, and one easier to follow up in the country than in the town, on the social effect of school: what had the children who passed through the Samois school become, how had they turned out? (cf. *Bul. Soc. ps. Enf.*, February, 1909).

Such was the man whom psychology has just lost. He leaves a gap which it will be hard to fill. The sad irony of it is that his country in which he so lavishly sowed the good seed of his fertile genius, should be one of the most refractory in the progress of experimental psychology. Further, his work even in his immediate circle was not always understood and did not receive the encouragement it deserved. Nevertheless, his name will remain among great names in the science of psychology, and the lapse of time will only make it greater.

OBSERVATIONS ON THE DEVELOPMENT OF THE COLOUR SENSE.

By Dr. O. DECROLY and Mlle. DEGARD.

Translated and abridged by T. G. Tibbey, B.A.

General Considerations.—The development of ideas of colour has already been the subject of several inquiries, and Miss Shinn has summarized some of the results as follows:—("The Development of the Senses in Childhood," University of California Publications, July, 1907.)

1. The sense of colour seems absent during the first months after birth.

2. The first signs of colour ideas appear at about six months, and the first colours noticed are those that have the greatest wave length; colours of short wave lengths are not perceived before the 18th month.

3. During the 3rd year, sometimes towards the end of the 2nd year, the child can note all the colours as well as an adult; he is also able to name them, and can point out the colour in the things around.

4. Light is a source of pleasure earlier than colour; similarly bright colours are preferred to others. At 3 years these bright colours often lose this advantage, and sometimes more subdued ones are preferred.

These conclusions, drawn from observations on her neice, and from those made by a number of other investigators, as Darwin, Preyer, Baldwin, and Mrs. Tyler, yet need to be further tested, since they are founded upon a small number of subjects, and it is important and interesting to bring new facts to support or invalidate them.

The following is a record of personal observations made upon a little girl from birth to $4\frac{1}{2}$ years:—

Long before the child is able to understand the type-experiments proposed by Preyer and Binet on colours (2 to 3 years) it is able to distinguish them. At 5 months 3 days, when this little one was crying, a red handkerchief was moved above her cradle. She smiled; soon she began to cry again; but upon the handkerchief being shaken, she again stopped and watched it, but did not smile. There was some doubt whether her attention was directed to the movement or to the bright colour. Eight days later she sent the same handkerchief, then hanging above her cradle, from one side to the other, smiling and crowing. Nine days later there was hung before her a red and a white handkerchief; she watched the red one carefully, and gave to the white but a passing glance; when shown the same red handkerchief and a piece of navy-blue stuff, it was the red which longest held her attention.

Some experiments made at 9 months with red, yellow, and green paper, and with red and yellow balls, were not conclusive, but tended to show some preference for yellow. At 12 months 15 days, four bottles were taken, exactly the same in form as her usual bottle of milk, varying only in the colour of their contents, one containing milk, the others solutions of red, yellow, and blue respectively. These being offered to her at meal time, suspended from a rod 15 cms. apart, she first showed some desire to play with them. They were taken from her and again offered, whereupon she seized the red bottle, but immediately relinquished it for the milk. When again taken from her and their places changed the selection of the milk was decided, as it was 4 and 7 days later. This showed that she recognized the milk by its white colour; but the authors are certain that had the experiment been made earlier she would have made this distinction before 12 months—which seems probable.

They next wished to see if, besides the perception of colour, she had the memory of this perception. Three boxes were made of the same form and size, opening easily, and coloured yellow, red, and green respectively. At 16 months 12 days the child was shown a piece of chocolate of which she was very fond, and, calling her attention to it, this was put into the red box. The three boxes were then thrown on the ground, where she was crawling, within her reach. The green box, the cover of which opened in falling, was before her, but she turned towards the red; then seeing the green box almost open, lifted the lid, looked in; then turned again to the red box, found and ate the chocolate, but still opened the yellow box. On the experiment being repeated in the same form she tried to take the box with the chocolate from the hands of the experimenter. When they were placed on the floor, she went directly to the red box and found and ate the chocolate, yet she still opened the other two and looked carefully in them, not having yet understood that the sweetmeat was only put into the red box. At the third and fourth experiments the next day, the chocolate still being placed in the red box, she on each occasion opened the green box first, then the red, ate the chocolate, and then opened the yellow. Evidently the results did not certainly show that the child remembered the colour of the box in which the chocolate was placed, but in the 29th month this was clear, for she only looked in that box and did not look in the others.*

When the child was 22 months 5 days old another test was given,

* The uncertainty in this result may have been caused by the fact that at first, opening and looking into the boxes was itself a matter of interest, which interest wore off later. It would have been well to have let the child play with the boxes at intervals during some days before beginning the experiment with the chocolate, to eliminate this disturbing factor.—T. G. T.

to see if she were able to compare two colours. For this two cards 25 cms. by 35 cms. were used, each divided into four, and on each quarter was drawn an outline of a man or woman, coloured respectively red, yellow, blue, and green. There were also made eight smaller cards, each one-fourth of the larger and bearing similar figures similarly coloured. The child was first shown how she was to put the smaller cards upon the space in the larger one bearing the figure like its own. At the first essay the red figures only were correctly placed; at the second, after being again shown, the yellow woman was put in its right position, but the two red figures were inverted; this seemed to show that an error had been made in introducing the second element of form, and that the figures ought all to have been of the same shape, leaving only the colours to be compared. Five days later, after some more lessons, the number of which was not noted, she could perform the task successfully; but even then she could only succeed when she was allowed to place the cards herself; when asked to show on the larger cards before her where the smaller should be placed, she failed, from lack of understanding what was asked of her.

She had from her 19th month showed some power of classification, but in her 23rd month, when an attempt was made to get her to sort out some red, yellow, green, and violet counters into similarly coloured boxes, she took little interest in the test and refused to do it; two months later, seeing her elder brother doing this, she wished to imitate him, and did so successfully.

In her 32nd month (31 months 20 days) she was able to place correctly, one above another, pictures of little girls dressed in brightly coloured clothes of different hues—for example, a red skirt, a green blouse, and a yellow sash; a yellow skirt, red blouse, and green sash, etc. This showed that she possessed the power not only of comparing colours, but also of noting their arrangement. In the 33rd month she often played with small beads, and of her own accord threaded together beads of the same colour, usually choosing blue. When one began the task for her she would continue threading them alternately, white and blue, yellow and red, etc., but she was unable to continue when two of each colour were alternately threaded; she had not yet acquired the idea of two, and it was much later before she was able to thread beads arranged in a more or less complicated order.

Thus the little maid could recognize, compare, and classify colours long before she was able to tell their names; it was not until the beginning of the 28th month that an attempt in this direction was noted. For "red" she used the word "ink," because, an inkstand with red ink being kept within her reach, and she having frequently spread

the said red ink over herself and her pinafore, the word "ink" often came into the terms of reproof, and she had attached it to the colour which attracted her rather than to the substance. During her 28th month she successfully applied this term to red substances, and about the same time made use of the word "black," but in the sense of darkness. In the middle of her 31st month she was first heard to use the word "red" correctly, this in reference to some radishes on the table; a few days later she compared a red box with her red pinafore. After this, however, for some time the word was used as a general term for all colours; at the beginning of the 34th month it was again accurately applied to red things, the word "blue" taking its place as a general term for all colours except red; "black" was still only applied to darkness.

Between the 34th and the 35th month considerable progress was made; black and blue were accurately applied, white and yellow were used, though the latter included also brown and orange, and was sometimes dropped in favour of "like an egg." During the 35th month the question, "What colour?" began to be understood. Thus by three years of age she knew the reds, blues, black, and white, and was hesitant as to yellow, and at this time began to show a great liking for making colour comparisons. For instance, a doll with black hair having been given to her, after examining it a moment, she said, "She has black hair; she is like Y—— "—a child with black hair. In a picture showing a small boy with reddish hair, she said, "There is hair like G.'s." Towards the 41st month she attached the colour to almost all the things she called attention to—"My black boots," "The white paper has fallen," etc.—and in the 42nd month she herself often asked, "What colour?" when the colour was not among those she knew. By the middle of the 47th month she was able to play a game at colour comparison, involving recognition of shades. She would examine the piece of coloured paper and place it with assurance on the identical tint, rarely making a mistake. The next month, when shown a piece of rock-crystal, she described it as being "like water," and in her 50th month she spoke of beads "like water," and "like beer," to designate those uncoloured and those of a transparent yellow. In her 52nd month she still called violet "blue," and protested when told she was wrong, but three months later had distinguished violet and found the colour of lilac very pretty. But even at this time she could not use the term "brown"; brown things were often spoken of as "like chocolate," and in her 58th month an overcoat was described as being "like the coffee that I drink."

Conclusions.—It would seem that for this little girl colour had some attraction about the sixth month, though this attraction may have

been due to the added factors of brightness and movement that were present.

The experiment with the bottles showed that during the second half of the first year the child had clearly become able to distinguish white among other colours.

The ability at 19 months to find the chocolate in the box in which it had been placed showed that the discrimination and memory of colour had already reached an advanced degree of development. This discrimination was shown more clearly in the 23rd month.

It was not until the 28th month that the first colour-name was used (ink); it may be noted that the term "red" served for a time for any colour and was first used exactly between the 34th and 36th month. At three years the question "What colour?" was understood; later she associated objects and colours (37 months), and afterwards began herself to ask, "What colour?" when the colour attribute became for her an important quality of objects (42nd month). Nevertheless, though brought up in an environment where, without particularly insisting upon the verbal side of observation, there was frequent opportunity of hearing terms relating to colour, this child, who appeared quite normal, did not show that knowledge of the complete terminology of colours at three years which Miss Shinn believes to be generally possible. Certainly in the development of the vocabulary it is not possible to eliminate the influence of the environment, which ought to have a marked effect upon subjects who have been through the special training involved in a study of the early development of colour ideas, otherwise we should not be able to understand how Warburg (*Münchener Medic. Wochenschr.*, 1909, p. 251), after an inquiry upon 1800 school children, could state that children of five years did not know all the fundamental colours, and that of those from six to seven years, 43 per cent. only knew completely the series white, black, red, yellow, green, and blue, and none knew brown, grey, and violet—just as one would not understand how MM. Binet and Simon (*Année psycholog.*, xiv., 1908, p. 3) could have placed among their tests for eight years that of naming the four colours red, yellow, blue, and green.

Note.—The above is from *L'Ecole Nationale* (Belgium), December 1, 1911. A copy of this is in the library, and members are referred to it for further details of the experiments.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Mental Heredity.—"We must discriminate between those properties of mind which we may loosely term its capacities, and those which we may term its contents. The contents of mind, its memories and its habits, its thoughts and its ideals, these are not inherited; they are without doubt acquired during the lifetime of the individual. But the capacity to acquire, and the inclination towards certain acquisitions, these may be present from the beginning. Were no other mental characteristic hereditary, educability, *ex hypothesi*, is. Consequently differences in educability may be hereditary too. While gross or absolute achievements are obviously affected by gross environmental differences, within the same environment the relative achievements may differ in a way which allows of no other explanation than inheritance. . . . [Observations show] the principles which such inheritance obeys. In the case of the individual, we found the influence of heredity large and indisputable; in the case of the race small and controverted."—*Cyril Burt, M.A.*, on "The Inheritance of Mental Characteristics," *Eugenics Review*, July, 1912.

The Importance of Sleep.—"In accordance with the laws of our nature whereby activity must be followed by a period for recuperation, each organ has allotted to it a definite cycle of work and rest. . . . Sleep is essential both for the needs of the nervous system and also for the regeneration of the organism as a whole; it has been shown that an animal will survive three weeks of starvation, but that complete deprivation of sleep for but five days will lead to death. . . . Children of school age are by no means always good sleepers, and inability to sleep is especially apt to occur as a result of overwork. Homework continued up to late hours is a fruitful source of sleeplessness, and this is especially the case where arithmetic and similar subjects are set. . . . The *immediate results* ['of insufficient sleep'] are a general loss of mental and bodily vigour which is often preceded by a period of abnormal mental clearness and activity. This soon, however, wanes, and the victim experiences a general langour and want of interest in his surroundings, a dislike to exertion, whether mental or bodily, loss of power and concentration, and a change of character to the side of irritability and mental depression. This mental deterioration not uncommonly gives rise to complaints on the part of masters; the boy is said to be lazy, is blamed for sleepiness in class, and may even receive punishments for his lack of attention. . . . On the physical side there may appear loss of appetite or dyspepsia, constipation, and loss of weight, and the patient

presents an appearance of lassitude with dark rims round lack-lustre eyes, and pallor and sallowness of visage."—*Dr. Clive Riviere*, on "Sleep," *School Hygiene*, May, 1912.

Physiological Education.—Madame Montessori says that her method is based on Séguin's *Physiological Method.* This is how Séguin describes it:—"According to this method education is the *ensemble* of the means of developing harmoniously and efficiently the moral, intellectual, and physical capacities, as functions, in man and mankind. The method consists in the adaptation of the principles of physiology, through physiological means and instruments, to the development of the dynamic, perceptive, reflective, and spontaneous functions of youth. The general training embraces the muscular, imitative, nervous, and reflective functions. All that pertains to movement, as locomotion, and special motions; prehension, manipulation, and palpation—by dint of strength or exquisite delicacy; imitation and communication from mind to mind, through languages, signs, and symbols. The senses are trained, not only each one to be perfect in itself, but so that if any one be lost, another may feel and perceive for it. Whatever development be given to the sensorial faculties, the reflective and spontaneous must receive a corresponding culture, and *vice versâ*."

NOTES.

Lecture Lists of the Societies.—BIRMINGHAM: *Children and Cinematographs*, H. Holman, M.A., November 19; *Children in Books*, Miss R. Sidgwick, M.A., December 10; *Presidential Address*, Dr. W. Jordan, January 21; address by W. A. Brockington, M.A., February 18; address by Rev. G. M. Moore, March 18. Meetings at the University at 6 p.m.

CHELTENHAM: Annual meeting, October 16; *Greek and Roman Child-Study*, Dr. R. Cunningham Affleck, November 14; Discussion, February; *Pre-preparatory Training*, Mr. Auden, March 13.

DUNDEE: *The Montessori Method*, Dr. R. R. Rusk, November; *The General Instinctive Tendencies of the Child*, James Drever, M.A., B.Sc., December; *The Development of the Social Consciousness in the Child*, John Sime, M.A.

HALIFAX: *Handwork in Education*, Dr. C. Reddie, October 2; address by Dora Walford, B.Sc., October 16; *What is and What might be*, H. H. Quilter, M.A., H.M.I., November 13; *The Backfisch*, Miss Bone, November 27; *The Montessori Method* (with apparatus), December 11; address by Dr. Williams, January 22; address by Prof. Green, M.A., February 5; *The Child—an Individual*, Miss Reynolds, February 19; *The Inheritance of the Child*, Dr. P. Sandiford, March 5; *The Boy Scout*, Rev. P. Gough, March 19.

LONDON: *Psychological Development and the School Subjects*, Dr. T. Percy Nunn, October 17; *Statistical Theory for Teacher and Administrator*, Dr. F. H. Hayward, October 31; *Maria Montessori's Method and Self-Education*, Madame Pujol (of Paris),

November 15; *Conference on the Montessori Method*, November 16; *The Outlook of the Adolescent towards Livelihood*, discussion, opened by Mrs. M. O'Brien Harris, D.Sc., and A. H. Paterson, November 28; *The Psychology of Music*, Dr. C. S. Myers, December 12.

MANCHESTER: *Printing in Colour from Wood Blocks*, Allen W. Seaby, October 11; Inaugural Meeting of Associated Educational Societies, November 6; *School Needlecraft*, Miss M. Swanson, December 6; *New and Old in Dr. Montessori's Method*, Miss C. Herford, January 24; *Punishments*, discussion, opened by Prof. Findlay, February 21; *Handwork*, discussion, opened by Miss Wroe, speakers—J. H. Judd, Miss L. Start, J. Shelley, March 21.

TUNBRIDGE WELLS: Lectures arranged on (1) *Age at which different Faculties Develop;* (2) *Physical Education;* (3) *Religious Instincts*, and the lines on which they should be developed; (4) *Imagination and Day-dreaming.*

Information Wanted.—An inquiring member is anxious to know: (1) Of any reports or articles on the question of the suitability of large orphan schools for young (fatherless) children, and comparison with maintenance at home with the (widowed) mother. (2) If any society has investigated the matter, or outlined any policy in regard to it. (3) Of any society (in England) which attempts supervision in regard to *child welfare generally.* If any reader can help, will he or she please reply to the Editor?

A Conference on the Care of Babies and Young Children was held in London in March last and was attended by Mrs. Richards and Miss Jobson as delegates for the London Child-Study Society. Addresses were given by Miss Margaret McMillan on *Nurture versus Education*, by Mrs. Pember Reeves on *Provision for Maternity*, Dr. Ethel Bentham on *The Work of the Baby Clinic*, and by Mrs. Despard on *Training for Parenthood.* The London Society's delegates sent full and interesting reports to the Council, and we regret we are unable to print extracts from them.

REVIEWS.

An Introduction to the Study of Adolescent Education. By CYRIL BRUYN ANDREWS. Rebman. Pp. x., 185. 5*s.* net.

There are many useful and suggestive remarks in this somewhat discursive book—which may prove helpful as an introduction to a more serious study of the subject. It would appear to be meant for teachers in secondary schools who have little knowledge of boy nature or of scientific methods of teaching. The following topics are discussed: the science of education—modern views and ancient dogmas; adult influence on adolescence; immorality and sexual perversion in schools; the cures of immorality and sexual pathology in schools; self-assertion and discipline, and its psychological and physiological aspects; future ideals.

Essays on Duty and Discipline, Vol. IV. By various authors. Cassell. Pp. 136.

This is a little book issued by the "Duty and Discipline Movement," and published "with a view to counteract the lack of adequate moral training and discipline, the effects of which are so apparent in these days amongst many British children, in rich as well as in poor homes." If the reviewer's ideas of education are sound, this volume is full of educational fallacies. Those who can separate the much chaff from the little wheat in it will waste their time in reading the book. One is sorry for other readers.

Our Children's Health at Home and at School. Edited by CHARLES E. HECHT, M.A. National Food Reform Association. Pp. 467. 5*s.* net.

This is the Report of a Conference on Diet and Hygiene in Public Secondary and Private Schools, held at the Guildhall, London, May 13, 1912. It includes the following papers, and discussions on them: "Diet as a Factor in Physical, Intellectual, and Moral Efficiency," by Dr. Clement Dukes; "Existing Methods and the Main Lines of Reform in Diet in Boarding Schools," by Miss M. E. Robertson; "Diet in Preparatory Schools," by W. H. Prosser, B.A.; "The Importance of Adequate Meals and Suitable Dietary in securing Efficiency and Good Scholarship," by Dr. Alfred A. Mumford; "Main Lines of Reform at Public Secondary and Private Schools," by Dr. J. Sim Wallace; "Instruction in the Elements of Physiology and Personal Hygiene," by Dr. C. E. Shelley; "The Teaching of Health (Personal and Social)," by Dr. Cecil Reddie; "Problems in Institutional Feeding," by Mrs. Stanley Hazell; "Training in Institutional Work," by Miss Marie Michaelis, M.A. There are also nearly fifty pages of specimen menus.

Those who have to do with children's diet, whether in schools or homes, will find much very valuable help and guidance in this volume. Mothers, matrons, and heads of boarding schools should get it, study it, and apply its teachings.

Introduction to Experimental Education. By ROBERT R. RUSK, M.A., Ph.D. Longmans. Pp. viii., 303. 4*s.* 6*d.* net.

"This work seeks to make accessible in convenient form for English readers the main results of the new investigations in the new subject of Experimental Education. It is based on E. Meumann's 'Vorlesungen zur Einführung in die Experimentelle Pädagogik.'" It discusses the methods of experimental education and gives a critical survey of the results of researches on physical and mental development, attention, sense-perception, apperception, memory, association and imagination, æsthetic and ethical development, individual differences, the doctrine of endowment, mental work of the child, mental hygiene, psychology of reading, writing, and arithmetic.

This should prove a most helpful book to all interested in the subject, as it brings together matter which has been very scattered hitherto, and serves both as handbook and bibliography. It is just the book that is wanted at the present moment, and is very ably compiled. Used with Dr. Claperède's *Experimental Pedagogy* it will give an admirable introduction to scientific Child-Study. One regrets that researches on motor development, and its relation to physical education (educational handwork, etc.), have not been dealt with at length.

L'Education Familiale. March, April, June, 1912. 44, Rue Rubens, Bruxelles. 6 fr. per an.

This publication often contains some useful articles, and those having children to care for might well consult it. As before noted, for it the mother is the centre of the universe; to correct this, in the March issue the father receives some good advice, which, if brief, is at least all-embracing. Notable articles deal with *Abnormal Childhood;* and *Physical Exercises*, in the March number; *Advice to Parents on Training Children*, in April and June; and *Notes on Children*, in June, which contains some useful advice on the value of observation.

Archives de Psychologie. February and March, 1912. Williams & Norgate. 3 fr. 25 and 4 fr. 25. **La Revue Psychologique.** December, 1911, March, 1912. Misch & Thron, Brussels. 2 fr. 50. **L'Educateur Moderne.** May, June, July, 1912. Paulin & Co., Paris. 1 fr. 25.

The article by Dr. Decroly and Mlle. Degard, on the *Evolution of Ideas of Continuous and Discontinuous Quantities among Children*, which is the leading article in the May issue of the *Archives de Psychologie*, is worthy of an exhaustive notice, which we are unable to give. This same number contains also the third of a series of studies upon the *Sleep of a Little Child*, by M. Cramaussel, the first two of which

have already been noted in our columns ; in this, the longest of the three, the author sums up his conclusions. For those interested in experimental psychology, a description of a new tachistoscope in the February issue should be of interest ; whilst the student of children should read a short article by M. Luquet on *The First Period of Drawing*. Perhaps, however, the most significant of all to the general educationist is an article by the editor, Dr. Claparède in this number, descriptive of *An Institute of the Educational Sciences*, and the needs which it will supply, in which he sketches the programme and justifies the founding of the new "Institut de J. J. Rousseau," which is to open at Geneva this session for the study of the more scientific aspects of pedagogy.

La Revue Psychologique is largely dependent upon its editor, Mlle. Dr. Ioteyko —and one wonders how she manages to get through such a vast amount of good work—with the assistance of Mlle. Kipiani. Together they contribute two articles to the December number on *The Rôle of the Muscular Sense and of Vision in Writing*, and *The Rôle of the Muscular Sense in Drawing*, while each contributes a separate shorter article. The issue for March, 1912, consists of some of the papers read last year at the First International Congress on Paidology, this selection being mainly devoted to the question of the teaching of Pedagogy, and the need for a unification of terms.

L'Educateur Moderne is closely allied to school work, much of which is, however, mainly concerned with French conditions. The May issue is particularly good ; the editor, Gabriel Compayré, contributes an interesting review of *New Schools*, giving Bedales as an English example ; a later article deals with *Poetry at the Elementary School* ; whilst there is also an interesting account of a "*Bush*" *School in Australia*. To the three numbers, Dr. Pauchet contributes articles dealing with *Self-education*, giving the views of a medical man strongly impressed by the value of suggestion and self-control, and interested in Eastern philosophy ; whilst June and July provide some interesting history of education in Northern Italy during the French occupation.

Publications Received.—*Bibliographie Pédologique Polonaise*, edited by Mlle. Aniela Szyc ; *American School Peace League*, Third Annual Report ; *The Life and Teaching of Jesus*, daily Gospel readings for young children, by Edith E. Read Mumford, M.A., pp. x., 160, Longmans, 1*s.* 6*d.* net ; *National Association for the Feeble-Minded*, 16th Annual Report ; *School Hygiene ; Eugenics Review ; Child Life ; Parent's Review ; The Journal of Education ; Educational Times ; The Woman Teacher* (weekly), and *The Woman Teacher's Magazine* (monthly) ; *Peace Day*, suggestions and material for its observance in schools, by Fannie Fern Andrews ; *Metropolitan Asylums Board*, 14th Annual Report of the Children's Committee ; *Agyermek* (*The Child :* the organ of the Hungarian Child-Study Society) ; *L'Education Familiale* ; *The Nature and Consequences of Deafness*, and *On the Classification of Deafness, and prevention of acquired Deafness*, two lectures by Dr. J. Kerr Love, issued by the National Bureau for Promoting the General Welfare of the Deaf ; *Love's Victories*, the Happy Publishing Company—"written, printed, and published by women," pp. xii., 143, 1*s.* net ; *Milton's Minor Poems*, introduction and notes by Rev. Edmund Dale, M.A., D.Lit., J. M. Dent & Sons, pp. 119, 1*s.* net ; *Old Rhymes with New Tunes*, by Richard Runciman Terry, illustrated by Gabriel Pippet, Longmans, pp. 32, 2*s.* 6*d.* net.

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Child-Study.

The Journal of the Child-Study Society.

MEASUREMENT IN CHILD STUDY.

By Sir JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

(*Continued from page* 78.)

There is one group of atypical children specially deserving of attention, that in which there is loss of moral control without appreciable intellectual defect. There are children—no medical man versed in mental disease will doubt it—in whom a diminution or defect of moral control is a symptom of a morbid mental state, apart from any such general disorder of the intellect as is ordinarily recognizable. Let me quote in an abbreviated form just one such case reported by Dr. Still, who, in his Gulstonian lectures, has ably and convincingly dealt with this atypical condition.

"A boy," he says, "nine and a half years, has been under my care for twelve months. Up till the age of seven he was a very obedient and well-behaved child. He had learnt to walk at eighteen months, and talked well at two years. He had convulsions when ten months old, but otherwise was thought to be a perfectly healthy child until the onset of the present condition. Just after the age of seven he altered altogether, and became extremely disobedient, taking little or no notice of commands. He was very self-willed, and tore his clothes to pieces when he did not like them. He showed unnatural cruelty—was found one day cutting up a living rabbit with scissors, and was, as his mother said, smothered in blood. At another time he was found beating chickens with a stick. He was expelled from the Sunday school because outrageously unruly and quarrelsome, and at a day school he was a continual trouble. He pilfered small articles and stole half a crown from his mother. On being taxed with his misdemeanours, he flatly denied them or invented plausible tales to account for them. He became filthy in his habits. Although extremely frightened by corporal

punishment, he would immediately after it commit the same offence for which it was inflicted. His maternal grandfather committed suicide, his paternal grandfather is insane, and a grand-uncle died in a lunatic asylum. He is," says Dr. Still, "a bright, attractive little fellow with a pleasing face, and no stigmata of degeneration, and his conversation is bright and intelligent, but he shows that lack of attention that is noticeable in so many of these cases."

In cases of this description, and they are numerous, it has been said that there is no appreciable or recognizable defect of intellect, but the lack of attention to which Dr. Still refers as common, suggests some involvement of intellect, not demonstrable by our present methods of investigation. In such cases, and indeed in all cases of mental defect, it has been felt that trustworthy tests of intelligence are a great desideratum. The usual course, in examining the feeble-minded, is to try them with reading and writing and simple sums in arithmetic, and to question them about current events and familiar objects, and in all pronounced cases that, taken in connection with physical stigmata, is sufficient to enable a judgment to be formed, and a place in classification to be assigned.

But it is in the slighter cases of mental defect that the want of a trustworthy standard has been felt, and indeed the want of such a standard is felt, apart from any measurement of positive defect, for the classification of school children generally. The ludicrous differences in the returns made by teachers, asked to sort their children into five groups: (1) brilliant; (2) above the average; (3) average; (4) below the average; (5) dull (the brilliant varied from 1 to 83 per cent.), make it abundantly clear that some new gauge is needed. Hence it is that a number of systems of precise mental tests more or less ingenious have been proposed. An admirable paper on the "Experimental Study of General Intelligence" was contributed to the Journal of the Child Study Society last year by Mr. Cyril Burt, who recommends reasoning tests by which all-round innate mental efficiency may be measured. But his tests are only applicable in the higher and more complex levels of mental activity, and cannot take the place of Alphabet or Spot, or Pattern or Dealing or Tapping tests. The test systems invented by Sante-de-Sanctis, by Binet and Simon, by Abelson have each their advantages, but I wish particularly to direct your attention to Kraepelin's Reckoning test as modified by Maloney, which seems to me to afford a good index to working intellectual capacity in the child.

Some time ago I communicated to the Royal Society of Edinburgh a paper on "A Method of Measuring Mental Processes in Normal and Insane People, with special reference to Maniac Depressive Insanity,"

by Dr. G. R. Jeffrey of the Crichton Royal Institution. I was, on reading that paper, so much struck by the results obtained by Dr. Jeffrey, who adopted the Kraepelin-Maloney method, and especially by the way in which the mental state of the patient was reflected in the work-curve, that I consulted him as to the employment of the test in measuring the intellectual capacity of children. The Reckoning Test, because of its simplicity, seemed applicable to all grades of mind, normal and abnormal, and as Dr. Jeffrey agreed with me, he kindly undertook a preliminary trial. The preliminary trial has involved him in a great amount of labour, but it has been carried out with the utmost skill and patience, and has yielded highly interesting results. These results will be embodied in a paper which Dr. Jeffrey will read before one of our learned societies, but in the meantime I am permitted to quote from the very able Report he has compiled and forwarded to me.

The Maloney-Kraepelin test consists, as I dare say some of you know, of ten columns of figures arranged vertically from the top to the bottom of the page, each column containing twenty-one units, and it is conducted as follows : The person to be tested is required to add up the digits in pairs as rapidly as possible. After a few seconds warning the test begins and the time is noted. At the end of each minute, the examiner calls "stroke," and thus the number of units counted in any particular minute is known.

Dr. Jeffrey's observations were made with the cordial assent of Mr. Carmont, the Chairman of the School Board, and with the zealous co-operation of Mr. Hendrie, the Head Master in St. Michael's School, Dumfries. Eighteen children, nine boys and nine girls of eleven years of age, were selected for examination, and divided into three groups—those of bright intellect, those of average intellect, and those of dull intellect, each group consisting of three boys and three girls. The children were tested for fifteen minutes each, at the same hour on five consecutive days and under the same uniform conditions of quietness and surroundings. Even with children of eleven years, Dr. Jeffrey found no difficulty in performing the test. At that age they could all count, and as the maximum of any two units never exceeded eighteen, the addition was of the simplest kind.

Dr. Jeffrey was much impressed with the different way in which the children began the test. All of them were keen, all showed a spirit of rivalry, but for the first day, at least, the attention of the girls was much more sensitive than that of the boys, and throughout that day they exhibited a distinct restlessness, which in the boys was quite inconspicuous.

As regards the rate of working, it was found that the bright boys

were very much better than the bright girls, the average boys not as good as the average girls, and the dull boys slightly better than the dull girls. These facts are, Dr. Jeffrey thinks, in accordance with everyday experience. A bright boy is smarter than a bright girl; but an average boy is not as alert as an average girl, while there is little difference between a dull boy and a dull girl. The total rate for all the boys was 19,717—for the girls it was 18,304; hence the boys worked more quickly than the girls, exceeding their total by 1413. That the rate is capable of improvement quite independent of intellectual capacity is apparent, for all the children, without exception, showed a marked increase in the rate on the fifth day as compared with the first.

Improvability was estimated by calculating the percentage difference in the work done between any two definite days. Between the first and the second day of the test this averaged in the bright boys, 49·1 per cent., in the average boys, 28·2 per cent., in the dull boys, 25·7 per cent. The boys of bright intellect showed that they had very soon—on the first day practically—grasped the test, and on submitting to the test on the second day they showed great improvement. At the end of the test all the boys showed that they were capable of great improvement, but as was to be expected, those of bright intellect reacted best. Between the fourth and fifth days, the improvement was very slight as compared with that between the first and second and between the first and fourth days. In other words, the maximum working capacity had been nearly attained on the fourth day, leaving very little room for improvement on the fifth day. Thus in the bright boys it averaged 2·4 per cent., in the average boys, 2·3 per cent., in the dull boys, 4·9 per cent. Hence, a fact is at once apparent, viz. that the dull boys, inasmuch as they showed more improvement at the end of the test than the others, are slower in working, slower in attaining or demonstrating their best.

Improvability in the girls differed in many ways from that in the boys. Thus between the first and second day in the bright girls, it was not so great, 32·7 per cent. (instead of 49·1 in the boys, a decrease of 16·4 per cent.). Hence bright girls are possibly not as good as bright boys. The improvement in the average girls between the first and second days, 32·3 per cent., was practically the same as in the bright girls, and exceeded that of the average boys by 4·1 per cent. The average girl is therefore slightly quicker than the average boy. In the dull girls the improvement between the first and second day was larger, it reached 44·6 per cent. and exceeded that of the dull boys by 18·9 per cent.—a further fact showing more improvement than dull boys.

It may be concluded generally that bright boys are really better than bright girls, and that average and dull girls are better than average and dull boys.

As regards errors, the total number in all the boys was 126, in the girls 134, and as the boys' rate of working was larger, 19·717 compared with 18·304, the accuracy of the boys is greater. The bright boys throughout the whole test had 21 errors, the bright girls 78; the average boys had 25, the average girls 10; the dull boys had 80, the dull girls 46. Hence, bright boys, besides being quicker workers, are more accurate, but girls of average and dull intellect seem to be more accurate than boys of the same level.

The nature of the errors, says Dr. Jeffrey, was interesting, and generally it was found that in those children who had several errors, these were of a definite and recurring nature, thus, for example, 9 and 7 were persistently called 15, instead of 16; 3 and 8, 12, instead of 11. By detecting these individual flaws in a child's counting power the test is of the highest value, for by corrections and practice these mistakes may be rectified and apparently false associations be broken down.

It is a distinguishing merit of the reckoning test in the case of children, that not only does it enable a correct estimate to be formed of their intellectual powers, and thus facilitate their classification for educational purposes, but it is itself education. The time expended on it is not thrown away. It is as good as a week's teaching in arithmetic. It improves the children's power of counting, and makes them obviously more alert: it increases their accuracy, no matter what their native intellectual capacity may be; it reveals the various arithmetical faults, natural or acquired, in their mental mechanism, and affords an opportunity of correcting these and breaking down aberrant associations; and it offers the means of demonstrating intellectual incapacity in many exceptional and atypical children in whom it is not superficially recognizable.

I have led you, I fear, into some intricate labyrinths of child-study this evening, and have proved but a purblind guide; but the maze of to-day in matters scientific may become the familiar highway of to-morrow, and I entertain the confident hope that we shall before long have a great clearing up in cerebral physiology, and a great advance in our educational methods, and in the rearing of children. This Society is doing its utmost to improve the situation, and the papers to be read at this Conference, and the discussions founded on them, will assuredly promote the objects it has at heart.

THE EXPERIMENTAL STUDY OF MEMORY.

By BEATRICE EDGELL, M.A., Ph.D.

(*Continued from page* 89.)

(C) *Nature of Association.*—Most important in learning is the form of connection established between the facts which is intended shall hereafter suggest one another. The superiority of the G method lies largely in the better conditions of association which it involves. In working with nonsense syllables, the only form of association which can be relied on is that of sequence. Since the time of Aristotle togetherness or immediate sequence has been put forward as a law of association, the Law of Contiguity.

Ebbinghaus' work with nonsense syllables proved the value of sequence as a condition of association by demonstrating that the more the original succession of syllables is departed from, the harder the task of relearning a series becomes. For instance, if from original series of 15 nonsense syllables new series are built by skipping 1 syllable, 2 syllables, 3 syllables, 7 syllables, the time of relearning such series steadily increases.

Original series . . .	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Skipping 3 syllables .	1	5	9	13	2	6	10	14	3	7	11	15	4	8	12

Modern psychologists, however, recognize that immediate sequence in time or togetherness in place is far from being the only, or even the most important, condition for establishing a connection between items of experience.

Professor Stout has supplied us with a useful conception of the conditions of association by his doctrine of conative unity. When we consider any section of our life, we realize that experiences which relate to the same purpose or aim, or involve the same interest, are interrelated one with another, whatever may be their temporal relationships. Our professional life and our home life may break across one another from the point of view of time, but each hangs together as a whole, and any portion of either is what it is in virtue of its relation to the whole. Such wholes are "conative" unities, syntheses of experience round a common endeavour. So on a smaller scale our ideas organize themselves into systematic wholes in virtue of some central thread. In attending to this, that, and the other, there has been a certain point

of view or interest, and thereby this, that, and the other form an organic whole, any one member of which can suggest another. Temporal sequence is just one form of such connection. I tried to devise experiments which should test whether togetherness, juxtaposition in space and time, was as strong a basis of connection as some very artificial connection due to a special point of view, or again as juxtaposition plus generic likeness. By the kind permission of the London County Council I was allowed to try these experiments with children in some of their schools. I used cards (9 × 6 inches) on each of which there was *either* a coloured picture of some common object together with a number, *or* two geometrical figures drawn with bold outlines in black ink, *e.g.* a circle and a square.

When trying to rely on juxtaposition I showed a series of five cards with an object and number on them, asking the children to look at the cards, and take in the object and number "side by side." Five seconds were allowed for looking at each card. At the end of the series, other cards were shown bearing the numbers on the original cards, and the children were asked to write down the object which they had previously seen with that number. The order followed in the test was not the order in which the numbers had originally appeared. For artificial association the same procedure was gone through, with this difference, that the children were asked to invent (each, of course, silently for him or herself) some connection between the object and the number while they looked at the card. Practice was given in this before any test was taken, and very ingenious were the connections invented, *e.g.* a picture of an ultra rosy apple and the number 85 called forth the artificial connection, "apple, ate five." An egg of greenish-yellow hue and the number 71 prompted the connection, "7 to 1 it is bad."

For juxtaposition and generic likeness the procedure was the same as in juxtaposition, the cards bearing geometrical figures being substituted for those with objects. In the test, cards bearing one figure were shown, and the children were asked to draw the figure which had accompanied it. The results of these experiments will be seen in the following table :—

TABLE VII.—AVERAGE NUMBER OF RIGHT ASSOCIATIONS OUT OF FIVE. BOYS AND GIRLS.

	Juxtaposition. (Diverse.)	Artificial Association.	Juxtaposition. (Akin.)
No.			
Boys (171)	1·56	1·55	1·64
Girls (229)	1·62	1·69	1·90
	Age 8–10.		
Boys (246)	2·18	2·45	2·49
Girls (198)	2·59	3·03	2·40
	Age 10–12.		
Boys (145)	2·87	3·49	3·02
Girls (223)	2·36	2·91	2·55
	Age 12.		

One feature to be noticed is the general increase in number of right answers with age. This is a feature which nearly all experimental work confirms. Here the boys over twelve show much greater improvement than the girls. For the younger children, juxtaposition and kinship seem to be more favourable than artificial connection. With the older children, artificial association gives the best result.

In every case bare juxtaposition gives the poorest result. The same experiments were tried with some adult subjects, the only difference being that in their case a series of tests were taken through several weeks.

The superiority of juxtaposition and kinship and artificial association is more marked in their case than in the case of children. The educational moral is easy to draw.

TABLE VIII.—AVERAGE NUMBER OF RIGHT ASSOCIATIONS OUT OF FIVE. ADULTS.

Subject.	Juxtaposition. (Diverse.)	Artificial Association.	Juxtaposition. (Akin.)
S.	1·3	3·9	4·4
H.	2·2	4·3	2·8
St.	0·55	3·3	2·5
C.	2·1	2·6	3·6
M.	3·3	4·1	4·5
R.	2·8	4·3	4·0

II. INDIVIDUAL DIFFERENCES.—Another subject on which experimental research has thrown light is the question of individual differences.

(A) *Speed of Learning.*—In regard to their learning capacity, individuals can be divided into "quick" learners and "slow" learners. The quick learner is one who can readily adapt his attention to what is required—usually he is one who can adjust himself bodily as well as mentally to a new task. He is "on spot" at once. The slow learner, on the other hand, takes time in bringing his attention to bear on the task before him, he adjusts himself slowly to the nature of the work. With this slowness in adaptation there is, however, in most cases a greater depth of concentration. Once adapted to the task the slow learner is more absorbed thereby than the quick learner. Indeed, it would appear to be this very intensity of concentration which makes it difficult for him to turn readily to a new task.

In common thought we usually connect rapidity in learning with ease in forgetting. "Lightly come, lightly go." With many subjects this appears to be the case. When tested by the Saving Method the quick learner shows little saving in comparison with the slow learner. The Saving Method was the method used by Ebbinghaus in his work. The matter to be learnt is repeated until it can just be said by heart, then twenty-four hours later, or at any given interval, the memory for this matter is tested by seeing how many repetitions are now necessary to enable the subject to just say it by heart. The difference between this number of repetitions and the original number is the *saving* effected by the retention of the previous experience.

The following tables will illustrate the comparative saving of the quick and slow learner.

TABLE IX.—SERIES OF SYLLABLES LEARNT AT THREE DIFFERENT RATES (SUBJECTS A, B, C).*

	Repetitions.				Time in seconds.		
	To learn.	To relearn.	Saving.		To learn.	To relearn.	Saving.
I. A	12·0	4·3	7·7	I. A	190·2	68·15	122·05
B	8·3	8·3	—	B	131·55	131·55	—
C	7·0	4·66	2·3	C	110·95	73·9	37·05
II. A	18·6	8·3	10·3	II. A	207·4	92·54	114·75
B	9·0	9·0	—	B	100·35	100·35	—
C	9·0	7·66	1·34	C	100·35	85·45	14·9
III. A	25·3	10·0	15·3	III. A	225·17	89·0	136·17
B	11·3	11·0	0·3	B	100·57	97·9	2·67
C	11·3	6·6	4·7	C	100·57	58·74	41·83

I. Speed, 15·85 secs. II. Speed, 11·15 secs. III. Speed, 8·9 secs.

* Ogden, "Untersuchungen über den Einfluss der Geschwindigkeit des lauten Lesens auf das Lernen," *Archiv. f. d. Ges. Psychol.*, B. ii., 1903, p. 126.

TABLE X.—TOTAL OUTPUT IN TERMS OF TIME FOR THE THREE SUBJECTS A, B, C.

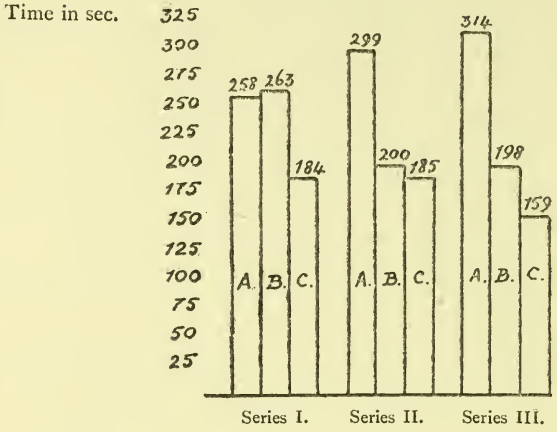
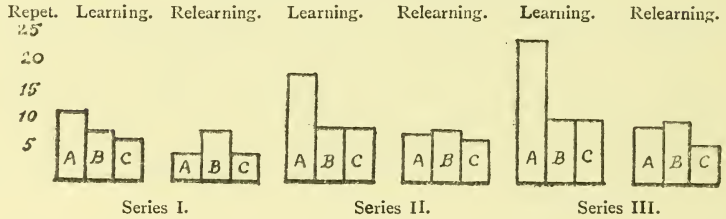


TABLE XI.—COMPARATIVE SAVING OF A, B, AND C AT THE THREE SPEEDS. GIVEN IN TERMS OF REPETITION.



The tables show that A needed longer time and a greater number of repetitions as the rate of learning was quickened. B and C, on the other hand, need less time as the rate increases. The number of repetitions required is very little more than with slow rate. When we look at the total output of work during the three series, we see how much greater is the time A spends in learning and relearning than that spent by B or C. The difference shows most clearly in Series III. where the rate is quickest. If, on the other hand, we consider what is *saved*, *i.e.* the retention effect, A exhibits far greater retention than B or C.

(B) *Imagery.*—The quick and slow learner usually differ in the type of imagery which they use in learning by heart.

The three main varieties of imagery are visual, auditory, and motor. Very few persons rely on one type solely; the majority use all varieties. Many, however, have a marked preference for one variety over another or are markedly defective in one direction.

In the case of words in which most of our learning is done, the visualist will see the words as printed or written, very probably he will also localize them with reference to context. He knows where on a page a certain fact is to be found, even if he does not remember the fact. The audile, on the other hand, hears the words, while the motile articulates them. It has been found that the use of auditory or motor is more favourable to rapid rate of learning than the use of visual imagery. I know this from personal experience. In a series of experiments I was required to learn to the beat of a metronome series of nonsense syllables. At a slow rate I could learn easily, but as the rate increased I found it more and more difficult. I depended upon visual imagery, and at the rapid rate I had no time to fix the syllables by sight, the hurried reading helped me less and less. My partner relied on sound, and whereas he was long in learning at the slow rates, he improved as the speed increased; the series yielded him a rhythm more easily and he learnt the syllables as a sound complex. Difference in imagery is important and is significant quite apart from its influences on rate of learning.

The following extracts from introspective records will show characteristic differences in the imagery suggested on reading certain words. The words were exhibited to the subjects who were instructed to perform a simple movement as soon as they had grasped the meaning of the word. They then wrote out how this meaning occurred to them.

TABLE XII.—SUBJECT ST.

Cuff.—Sound. Muscular image of movement of arm in giving a cuff. Feeling that I had lately come across the word in this connection. Then visual image of white cuff, very vague.

Damp.—Sound. Recalled corner of garden at home called "damp corner," not visual image of it, but rather my own position in the garden, knowing it was near me in a certain position.

Blind.—Sound. Image of my own eyes, positional. "Milton" sound of the word, recalled a technical on the subject.

Parcel.—Sound. Visual image of brown paper parcel. Shape very vague. Image of movements in carrying parcel.

TABLE XIII.—SUBJECT S.

Guard.—Word articulated, sounding of "g" in throat very marked, a momentary image of man in blue serge, very blurred.

Gate.—Word articulated, visual image of gate, them motor image, "I'm sitting on the stile, Mary."

Test.—Word articulated. Words articulated, "Test your results."

Music.—Word articulated. Words, "Music hath charms," articulated.

Board.—Word articulated. Words, "Board of directors" articulated.

Curve.—Word articulated. Visual image and word "Parabola."

TABLE XIV.—SUBJECT H.

Young.—Feeling of word being spoken and sound; thought, "Child."

Meat.—Feeling of word being spoken and sound; thought, "You know what it is, beef, mutton, etc."

Handle.—Sound of word and feeling of word being spoken. Image of brown strap-handle.

Strength.—Sound of word and feeling of word being spoken. Image of a man lifting heavy weight.

Sweet.—Feeling of word being spoken and sound, thought of sugar.

TABLE XV.—SUBJECT C.

Reel.—Small yellowish reel of fine white cotton.

Cream.—Saw yellow cream at first alone, then basin developed, such as milk used to be put in when I was a child.

Loaf.—Part of loaf of bread (white). Feeling that there might be brown too if I looked long enough.

Style.—Nothing at all. Feeling of strangeness and helplessness.

Risk.—Nothing but the feeling that nothing was coming.

Soup.—No image. Nothing except eye sensations.

St. is interesting as showing only auditory images for words, while she has motor images for bodily movements generally.

S. In this case the verbal image is motor, the articulation of words and the suggestion is likewise articulated words.

H. has both auditory and motor imagery of words.

The suggestive force of the word is to call up an example illustrating the meaning, either as the image of a thing or as another word.

C. This subject found the experiments very difficult. No reference is made to the word.

(C) *Trustworthiness and Completeness.*—An important individual characteristic is the accuracy or inaccuracy of memory. There is often a difference between the Immediate and Mediate Memory of the same individual in this respect.

An individual, whose reproduction of data presented only a moment before is faulty, both in respect to clearness and completeness, may be one whose reproduction in Mediate Memory is trustworthy and full.

It would seem as if Jost's hypothesis, *re* "ageing" of associations,

were relevant in this connection, viz. that the memory is more mature after a certain interval than it is immediately after experience, and that this is the time at which repetition is most beneficial. On the other hand, there are individuals who can reproduce very accurately and fully at once, but whose memory is quite untrustworthy after the lapse of a short interval.

Experimental investigation of children's memory in comparison with that of adults contradicts the commonly accepted opinions on this point. On the whole, the memory of adults is far better than that of children. The adult can learn more quickly, reproduce more faithfully, and deal with a larger mass of material. What he cannot do, is retain as permanently. Unless he renews his experiences his memory will fade out more quickly than would the child's. To a certain extent this can be compensated for by his power of forming more far-reaching associations.

III. Improvement of Memory.—In children memory seems to improve with age from eight to fourteen or fifteen.

So many factors influence memory that it is difficult to say to what this improvement is due. The child acquires a greater power of concentrating attention, more material wherewith to form associations, experience teaches him what is likely, and what unlikely, to happen, and he become less liable to fill out his memory gaps with fiction.

Much has been said on the subject of memory training. I can only just touch on this point. Memory technique usually consists in aiding association by building up artificial principles of connection: mnemonics. Mnemonics have their use. Often the principle of connection is striking, and appeals at once to the learner, *e.g.* what could be of greater appeal to the school boy or girl, who is thinking that there are far too many battles in the Wars of the Roses, than the tag, "All boys never will mind, etc." But memory training needs something more than mnemonics. I think it is possible, even in ordinary school work, to do something towards *training*, as well as *exercising*, the memory. The teacher can teach children to help themselves. They can be shown how to learn, how to notice what is important, how to build rational associations. It is worth while encouraging a child to try different ways of memorizing, to find out whether visual, auditory, or motor imagery will help him most. Above all, it is important to make him realize that "will." "Effort" will do more than anything else to aid memory. Take a thing in with the intention of being able to re-experience it, and you will find that you have helped yourself to success. But I am touching on matters which are better known to many of you than to me, and with this I will conclude my lecture.

THE TUBERCULOUS CHILD.

By JANE WALKER, M.D., Brux., L.R.C.P.I., L.R.C.S., Edin.

Medical Superintendent East Anglian and Maltings Farm Sanatoria, Nayland.

A Paper read at Conference of the Child-Study Society, held in the University of London, Friday, May 10, 1912.

The importance of tuberculosis in childhood has been gradually growing in intensity. As far as pulmonary tuberculosis was concerned, opinion has, till quite recently, been in favour of its great rarity, and, as far as the disease is confined to those manifestations which we see in adults, viz. the hacking cough, wasting, profuse expectoration, hæmoptysis, together with the physical signs of cavities, and breaking-down lung, we should all be agreed that it is extremely rare in childhood. And we should all be agreed, too, that when it does occur in such a manner, it is a disease of great gravity. Taking a rough estimate of the cases of pulmonary tuberculosis in children under my charge during the last ten years, the mortality cannot have been less than 20 per cent.; it may, indeed, have been as great as 39 per cent., according to whether the cases lost sight of are considered to be living or dead.

But setting aside these rare cases of such extreme severity, it is becoming more and more evident that we have to deal with a considerable amount of tuberculosis in young children, and it may be that a large part of the tubercle in adults is contracted during early years of life. Indeed, from the frequency with which signs of healed tubercle are found post mortem in children who have died from something else, we must assume that this is so. Hence it follows that in any comprehensive scheme for dealing with tuberculosis, the question of its incidence in childhood must be one of the very first and foremost considerations. The signs and symptoms of the disease are often very vague in childhood, and may all be attributed to other causes. Such are loss of energy and strength; the child tires readily even with ordinary occupations, and without additional exertions; it is pale, anæmic, short of breath; it has no appetite. It is sick, has a little fever, some sweating at night, cough or pain in the chest or side. But all these symptoms may be due to other causes, and certainly considered separately, cannot point definitely to phthisis. For example, a child is tired and languid and inattentive, this may be entirely due to its home circumstances. I remember a marked instance of this occurring in a child in one of the Edinburgh schools. She was weary, inattentive, listless, and often came

late to school; in her case a drunken father compelled her to sit up till he came home when the public houses closed. Then digestive disturbances may be the cause of the ill-health, and, in its turn, it may be the result of bad and insufficient and unsuitable food given at unsuitable times, *e.g.* late at night. Loss of weight, to be a symptom worthy of note, must be progressive, and must be well marked. Persistent fever, lasting over some weeks, even if no other symptoms are obvious, is always suggestive of tubercle. Cough is not to be made much of, as it may occur in so many other conditions. But the fact is such slight infections do occur, and they heal, and, therefore, it may be that many cases of flagging health and debility in children are due to an unsuspected and unrecognized focus of tubercle somewhere. Such a focus may, of course, become quiescent, and give no farther trouble; it may, on the other hand, blaze out with fatal results. And the time, as we all know very well from our own experience, when this is most likely to take place is when the boys or girls are emerging into manhood or womanhood, and are taking up the work of life under harder circumstances, and when they are less sheltered and cared for than they were before. The mortality from phthisis is three times as great from fifteen to twenty years as it is from ten to fifteen. We are largely dependent for our knowledge as to the extent of tuberculosis in childhood on the reports of the School Medical Officers, whose appointment was made necessary by the enactment of the compulsory inspection of school children. What do we find? We find the greatest diversity of opinion amongst them. Indeed, the vexed question of the diagnosis of pulmonary tuberculosis is far from being solved, and the number of cases differs considerably in different localities. In Worcestershire, for instance, one of the Assistant Medical Officers diagnosed pulmonary tuberculosis in about 15 per cent. of the children examined; whereas, on the other hand, in Hertfordshire, out of a total of 12,772 children examined, one case of tuberculosis only was recorded. Taking two towns in the north of England, we find that the number of cases in Bradford is 42, out of a total of 7091, *i.e.* of every 1000 children examined in Bradford, fewer than 6 have been returned as consumptive; whereas at Barnsley, out of 3356, 63 children are returned, or nearly 19 out of every 1000 children examined, so that Barnsley appears to have more than three times as much tuberculosis amongst its children as has Bradford. When some say it is rare, and others (and those of wide experience and whose opinion has great weight) give 30 per cent. as the *probable* incidence of pulmonary manifestation, it is unwise, at the present moment, to make any very definite pronouncement as to the numbers of cases of tuberculosis in childhood with which we may find ourselves confronted.

The diagnosis of early pulmonary tuberculosis is extremely difficult even in adults, and in the hands of medical practitioners of the widest experience, and of most skilful powers of detection of disease. Dr. Walther, of Nordrach, used to say that nothing but time would tell how a sufferer from phthisis was going to do; and, just in the same way, it is time alone that can be depended on to tell us whether we have been correct or not in diagnosing pulmonary tuberculosis in a child.

Under this head, may I impress on my hearers the extreme importance of the plan suggested and carried out by the Board of Education, viz. the following up cases for years? Cases of vague illness in grown-up persons, as well as in children, are often due to some small focus of tubercle which may be quite incapable of positive detection. At the risk of being charged with a desire to introduce King Charles's head into the discussion, I must reiterate my conviction of the absurdity of present-day medical education with regard to pulmonary tuberculosis. Considering how many deaths from this disease occur during the year, and that it is by far the most important disease to which flesh is heir at the present era and in this country, it is much to be deplored that cases of pulmonary phthisis are not taken into our general hospitals where medical schools are attached. It is true that occasional cases are found in the wards, but they are of the kind that need no skill to diagnose, for they have their disease written large all over them, and could be recognized with certainty if they were passed in the street by the merest tyro in observation. That sort of case is largely past help, and its presence helps to fan the flame of pessimism so largely prevalent *still* in the medical profession with regard to pulmonary phthisis. Medical schools ought to be obliged to make adequate provision for the training of their students in the detection of early cases of phthisis. They should be made to weigh the value of this symptom and that in the diagnosis. They should be encouraged to make a tentative, and not a positive diagnosis, and to keep an eye on the case for a long period of time. They should be induced to see that a disease of such protean variety and such wide excursions—now mending, now going back a little, now making a great leap forward towards absolute recovery, and now getting a set back—all of which, to the trained observer, can be reckoned on, regulated, and accounted for to a nicety; that such a disease is of the deepest interest, and that it denotes a lack of scientific intelligence to pass it by on the other side as an incurable illness, and therefore of little importance.

One more thing on this head. Early diagnosis, and the consequent atmosphere of hope that it will bring about, is essential; we must also do away with that conspiracy of silence which has been the bane of

the treatment till lately. The utter folly of refusing to allow a patient suffering from phthisis to know what is the nature of his disease, when his active, earnest, and intelligent co-operation is an essential element in his cure, will be apparent to any one who has, even in a small degree, got beyond the idea of the disease being incurable. It has been well said, "No fool was ever cured of consumption"; but if you do not let him know what he is to do, how can he help being a fool?

This reference to improved medical education, thereby enabling medical practitioners to recognize cases of pulmonary tuberculosis early, brings me to the point of brief consideration of the National Insurance Act. Confining ourselves to the clauses concerned with "Sanatorium benefit," we have the skeleton of a complete scheme for dealing with the whole amount of tuberculosis of all kinds in the United Kingdom.

Under the Insurance Act, whereas the medical benefit, sick benefit, and maternity benefit only come into force at the end of six months, the sanatorium benefit comes into force when the Act comes into force, on July 15 next. In order that we might be, in a measure, prepared for this great change, a Committee for the Provision of Tuberculosis, on which I have the honour of serving, was appointed to draw up suggestions for a complete scheme, and the Interim Report of that Committee is now published. Although the special subject under consideration in this paper is the tuberculous child, it can only be properly considered as part of a general scheme. Clearly the first element in such a scheme is to know with what we have to deal, and, therefore, all cases of tuberculosis should be notified. As you all doubtless know, compulsory notification of pulmonary tuberculosis came into force on January 1, of this present year, and there is a fairly strong feeling that it should be made applicable to *all* forms of tuberculosis.

The second element in the scheme is the Tuberculosis Dispensary, or Institute. As many of you know, tuberculosis dispensaries have been established in many parts of London and elsewhere, under voluntary agencies, on what has now become well known as the Edinburgh plan. Except in purely administrative details the dispensaries about to be organized will be on the same lines as those hitherto in existence. There are now many municipal dispensaries where very much the same régime is pursued. The dispensary may be considered as the first line of defence, and as forming a kind of sorting, or clearing house. This is spoken of in the Interim Report *

* Interim Report of the Departmental Committee on Tuberculosis, 1912. Price 3*d*. [Cd. 6164.]

as the first unit, and it will either be directly controlled by the Medical Officer of Health and his assistants, or if it is provided voluntarily, it will be linked up with his department, and with the school medical services. It will also be intimately connected with the hospitals and general dispensaries in the district. It should be, in fact, a centre for the diagnosis and organization of the treatment of tuberculosis in the area in which it is situated. And as its work becomes better understood, it will be found that persons will come to it with slight symptoms, to find out whether they are suffering from tuberculosis or not. It is obvious how this will give an impetus to more accurate diagnosis and detection of early cases.

In its function as a clearing house, the tuberculosis dispensary will sort out the types of the disease, and draft them on to the various sections of the second unit, to which we shall refer later on, or keep them, if suitable, and treat them at the dispensary. Cases suitable to be treated at the dispensary will be those of patients whose illness is so slight that they can remain at home and follow their usual occupations, simply attending as out-patients, and having the treatment, whether by means of tuberculin or other special methods, appropriate for their condition.

There is another most important function of the dispensary, and that is to search out and examine "contacts." For this purpose, the home of a patient suffering from tuberculosis is visited, and all cases with whom he has been in contact are examined. The great value of this work is shown by the fact that no inquiry of this kind made by the existing dispensaries has been undertaken that has not resulted in the finding of disease in one or more contacts. In addition, the surroundings of the patient are noted, and if they are unsuitable, the attention of the proper authorities is drawn to it.

Another important function of the tuberculosis dispensary is that of after-care. All patients who have been under treatment for tuberculosis require a friendly eye on them from time to time. Indeed, the proper carrying out of this part of the scheme adds very considerably to the success of the treatment. By its means the spread of the disease will be checked, and there will be fewer cases of relapse than would otherwise occur. In the case of necessitous patients, it will be able to render timely help by food, by the provision of a sleeping shelter, and in some cases of sputum flasks and handkerchiefs, etc. It will do this by means of Voluntary Care Committees, the C.O.S., Guilds of Help, or any other agencies in its neighbourhood.

From the scientific point of view, the records kept at the dispensary will be of increasing value in determining the prevalence of the disease in its particular district, and also the results of special forms of treatment.

For the purpose of dealing with children, the dispensary must be regarded as a school inspection clinic (in some cases the children may have to be sent on to a regular school clinic), from which the children would be referred to a hospital, sanatorium, sanatorium school, residential tuberculosis school, or a special day-school.

It is of the highest importance to undertake the systematic treatment of tuberculous children. Children afford the best opportunity of detecting and dealing with the disease in its earliest stages, and the more the resisting power of the children is increased, the less will be the burden of disease on the next generation.

The same adverse circumstances that bring about tuberculosis in adults, bring it about in children; such as bad housing, want of fresh air, and insufficient food; this last factor seems, however, to be even more of a determining cause in the product of the disease in children than in adults.

In the complete scheme for dealing with tuberculosis, both in the insured and the non-insured person, the dispensary, or first unit, regarded for the moment as a clearing-house pure and simple, leads on naturally to the second unit, with its various divisions. First, the sanatorium for early cases. These cases will have to be selected with considerable care, and it is to be hoped that the larger number of them will return to the community as economically efficient persons. Each sanatorium ought to have enough land to allow of graduated labour being carried out, and therefore the second division of the second unit may be called the Farm Colony, which may be carried on as a separate institution; but, more properly, it comes into ordinary sanatorium treatment when a certain number of selected patients are retained as working patients, either permanently, or till they are sufficiently restored to health to return to their ordinary occupations. Let me say here, in passing, that in practically all cases patients should return to the work they are most accustomed to, especially if they are over twenty-two or twenty-three. They know it, they do it most easily, and, generally speaking, they make most money at it, all very important items in dealing with such a disease as consumption, where anxiety and diminished earning capacity play so large a part.

Then there is the third division, the home for advanced cases, where patients can go either for a prolonged period, or for the rest of their lives. It must not be forgotten that the advanced case is not necessarily the fatal case, only these cases take much longer to recover, and their chance of regaining economic efficiency becomes increasingly less.

Pulmonary tuberculosis is a local expression of a general disease,

and it is not unfrequently found that a patient with a large and extensive lesion is more highly efficient from an economic point of view than one with a very limited lung affection, but with profound general disturbance. So that the difficulties of predicting the future of a case on physical signs of disease in the lungs alone are very considerable, and only experience will enable us to estimate the chances of recovery in any given case.

These various divisions will all be required in any complete scheme for dealing with tuberculosis, but the two *chief* things to bear in mind are—

The Dispensary as first line of defence, and

The Sanatorium as the second.

So much for the general question. To return to tuberculous children, our energies must be directed to the home, school, or sanatorium treatment, remembering always (to quote from Dr. Newsholme's "Prevention of Tuberculosis") that tuberculous infection in children is nearly all domestic, and not scholastic, in origin, and therefore the home surroundings should be thoroughly investigated.

For purposes of treatment, cases of tuberculosis in children may be divided into—

1. Non-pulmonary, or surgical.
2. Pulmonary, or medical.

Non-pulmonary. The most important elements in this group are diseases of spine and bones and joints, but it also includes glandular swellings. These diseases account for about half the crippled children in the London schools, and it is an interesting fact, noticed both in America and this country, that the disease begins before the school age, *i.e.* during the first six years of life. This observation confirms the view of the home being most at fault in such cases, and it also accounts for the severity of the deformities, for the early symptoms of diseases of bones and joints are vague, and not marked by pain. The child may be simply awkward, or limping, or may sit down on the floor instead of stooping to pick up its toys, all of which seem trivial signs to an unexperienced onlooker.

It is quite evident that such children cannot be retained in an ordinary school. Up to within quite recent years, the plan has been to send the child to a hospital during the acute stage, and then, as soon as that stage was passed, to send it home either to attend as an out-patient, or to receive some sort of treatment at home. This has been the best obtainable for the larger number of cases up to quite recent times. It is obviously highly unsatisfactory, and it accounts for a very large proportion of crippling deformities, materially increasing

the length of treatment. Indeed, the time that must of necessity be occupied in the treatment of these children is the prime difficulty if they are not to be deformed, and if they are to grow up in any degree economically efficient. The best method of applying surgical treatment in children is undoubtedly under sanatorium conditions, where treatment and education can be carried on at the same time, and a suitable occupation or trade taught whereby the patient may earn his living when the time comes for him to do so. The hospital at Alton, founded by Sir W. Treloar, fulfils all these conditions, except that it has no arrangements for teaching girls a trade, and it may justly claim to be considered a model institution, which other institutions to be subsequently organized should copy. For it fully meets the needs of those afflicted with surgical tuberculosis. It is situated in a district where tuberculosis is uncommon, and it is so placed, on a southern slope, that patients get the maximum of sun and air, without undue exposure to wind. Moreover it is large, and is capable of expansion, and an institution where the very highest specialized training and skill is an essential, the numbers should be large enough to make it possible to have the best medical superintendent obtainable. Such an institution, too, must be large so as to reduce the cost of administration and maintenance. For the treatment to be efficacious and to be carried out in the best possible way, costly appliances are necessary, such as up-to-date X-ray apparatus, and if these things are to be in a number of small institutions, instead of in a few large ones, the cost of each place will be increased, and the efficiency correspondingly diminished.

Alton possesses an excellent X-ray department which is continually used, and without which a great deal of the best work done there would be impossible. It also has another essential, a plaster room where casts of the limbs are taken, upon which the beautiful celluloid splints, with which so many of the patients go out, are fitted, and where the affected limbs are set up in plaster. (Out of 190 children discharged last year, 141 left with splints or spinal jackets.)

The food is an abundant supply of the ordinary plain kind, and the strictest attention to economy is exercised in this, as, indeed, in all other details of the management.

Alton is also a special training school for nurses, and young nurses from eighteen, who have had no previous training, are desired. They stay for three years, and receive a certificate of three years' training, and they are uncommonly well taught by both matron and medical superintendent. One plan followed at Alton, and at no other place, is that the nurses undertake the duties of the teachers, and all children able to do so receive regular instruction. Another very interesting

department of Alton is "The College." There crippled lads from fourteen to eighteen are received for technical training in an occupation suited to their limitations, for a period of three years, and they are so well taught, that on discharge they are able to take up remunerative and self-supporting occupations. The staple industry in the College at Alton is the making of leather goods of all kinds, from quite small articles, such as blotters, little dispatch cases, to large leather trunks.

An indispensable element in the treatment of these children, as, indeed, of all sufferers from tuberculosis, whether pulmonary or non-pulmonary, whether in adults or children, is efficient and prolonged *after-care*. The system on which this is carried out at Alton is excellent. When a patient is discharged, a written paper of directions is given to the parent, or guardian, to whom its meaning is carefully explained. It is minute and particular, and nothing is left to chance, or to the parents' imagination. To enable the medical superintendent to see that his directions are being carried out, all London patients are required to be brought to the Out Patients' Department in London once in three months.

Among other institutions where such cases can be treated are Swinton House, Manchester, where the treatment and general management are excellent, but where the situation is not nearly so ideal; and the Royal Liverpool County Hospital for Children, at Heswall, and in this connection I cannot do better than quote some remarks of the Medical Officer to Heswall for 1910:—

"Two years have now passed since we moved into our buildings at Heswall, and since the foundation of the hospital in 1899 we have practically passed through three phases of experience. In the first years of our work the children were kept in closed wards, excepting during the warm months of the year, when they were often outside for part of each day. Then came our first year at Heswall, when with the expenditure of much labour, the patients, beds and all, were moved out in the early morning, and, weather permitting, were left out until the evening. Latterly, some of our open-air wards were completed, and during the greater part of 1910 treatment has been carried out entirely in the open air in the cases of all the children, except a few who require to be kept indoors during very severe weather. These experiences have taught us that, while treatment in closed wards produced results superior to those attained in the town hospitals, those results were a long way behind what were attained when the children were out all day and slept in at night; while the third phase, when the children were treated altogether in the open-air wards, produced results incomparably the best. The economic advantages of purely open-air

treatment are manifested by the fact that the period of treatment in all cases is greatly shortened."

Very considerable provision for London children chargeable to the Guardians of the poor suffering from various forms of tuberculous disease has been made in recent years by the Metropolitan Asylums Board. The institutions under the control of this authority at which these cases are received are—

East Cliff House, Margate (130 beds), which is adapted for open-air treatment, and reserved almost entirely for cases of surgical tuberculosis, has been under the control of the Board since 1898. 3595 cases have been treated there, and many remarkable successful results have been achieved.

The Millfield Sanatorium (120 beds), on the coast at Rustington, near Littlehampton, was provided with verandahs and a sun-room, as proposed by the late Sir William Broadbent. This sanatorium is reserved for diseases of the lungs, and 821 children have been under treatment since its opening in 1904.

Queen Mary's Hospital for Children, Carshalton, Surrey (850 beds), open 1909, is a modern hospital on the bungalow system, and is well-equipped with verandahs. Since the opening, some 5311 poor children have been under treatment, and it is estimated that about 20 per cent. of them have suffered from tubercular disease.

A few cases have also been received at the Park Hospital for Children (800 beds), Hither Green, Lewisham, S.E.

No ordinary general, or children's hospital, however good, nor any ordinary convalescent home is comparable with such an institution as Alton. The former cannot keep their patients long enough, the latter have, in the majority of cases, neither suitable equipment nor staff.

We find that taking the second and most difficult section, viz. medical tuberculosis, the bulk of this is pulmonary, and if the disease is really pronounced and definite, the best method of treatment is at a residential sanatorium. The following are the institutions at present established:—

1. Kindercot Children's Sanatorium School, at Peppard, near Reading. This is a separate department of Maitland Sanatorium, and is intended for children with early pulmonary tuberculosis, with a view to enable their education to be carried out under the best possible conditions, instead of being stopped, as is so often the case. It provides accommodation for about 20 children, and is under the direction of the Resident Medical Superintendent, Dr. Esther Carling, and there is a resident matron and a schoolmistress. As far as possible, fairly regular school hours are kept, and the instruction given is modern and up to

date. The children also do light house-work. The cost is about £1 a week.

2. The Children's Sanatorium, at Holt, which has been in existence for about eight years in temporary premises. A new building is in course of erection, and it will be opened some time during this summer. It will accommodate 40 children. Cases are sent mainly through the Invalid Children's Aid Association, Poor Law Guardians, and other bodies. Girls may remain up to sixteen, but boys only to seven years of age. The weekly cost is about 27*s*.

3. Stannington Sanatorium for Children, Northumberland. It can accommodate 100 children, 50 of pulmonary, and 50, on the other side, of surgical cases. There are at present no arrangements for giving instruction to the children, but it is hoped before long to do so. Such provision would greatly add to the value of an institution of this kind.

5. Gateforth Children's Sanatorium School, in connection with the Sanatorium at Gateforth for the city of Leeds, accommodates 20 children.

6. Royal Victoria Hospital for Consumption, Edinburgh, although for adults, admits a few children, and in addition about 12 children spend their days there from 8 a.m. to 7 p.m.

7. The Manchester Education Authority has established a residential Sanatorium School at Summerseal House, for early cases. Here 40 children can be taken.

8. Sanatorium at Harpenden, a department of Dr. Stevenson's Homes, an excellent building, and an institution doing very good work, which has 50 beds. It has hardly completed one year of working.

9. Dr. Barnardo's Sanatorium at Barkingside, Essex.

There are also the following day schools:—

1. Kensal House, established in connection with the Paddington Tuberculosis Dispensary.

2. The Whitley Open-air School for Phthisical Children, near Reading.

3. The Barnsley Open-air School.

The cost of sanatorium treatment for children is comparatively high, from 15*s*. to 20*s*. per week, hence as many as can be should be treated in ordinary schools, modified as open-air schools. In planning such a school, it should be remembered that the home surroundings are generally as unfavourable as can be, and that the less time spent there the better. So the curriculum must necessarily extend over a much larger portion of the day than does that of an ordinary school. It should begin early in the morning, and go on to late in the day, and must include feeding and opportunity for resting. There should be a

nurse in attendance, and careful medical supervision, for many of these children will have signs of active disease, and their work and rest and exercises must be arranged accordingly. Of course as much attention as can be must be paid to the home surroundings, for, as we have seen, it is there, and not at the school, that the seeds of the disease are sown.

In conclusion, I should like to say a few special words about the treatment of children in a sanatorium. Whatever arguments may be brought against sanatoria for grown-up people, they have very little, if any, weight when we come to think of the subject from the children's point of view. Let us consider a few of the objections.

People say, "Oh, I should not like to go to a sanatorium; it is so depressing. I cannot bear to see people who are ill, and I should be so miserable if I knew they were not going to get better." Children are not depressed by illness; they may be annoyed by it if it prevents them making as much noise as they wish; but, in truth, they are more often amused and interested. (Please understand that I am not endorsing the view that a sanatorium is a depressing place; it is one of the most cheerful and cheering places in existence.)

Then another objection is that it encourages loafing, that sanatorium patients lose the habit of work. That is an old story, and we have changed all that; but whatever modicum of truth may lie in it for grown-up people, there is not one atom as regards children. *The* difficulty with children is to keep them from doing too much, as any one knows who has had the privilege of looking after them when they are ill; and this necessary discipline of learning to keep quiet and still is far better taught in a community where every one is doing the same thing than at home, where the temptation to do what the others are doing is almost too great to be resisted.

Then, as we have seen, a certain amount of education and instruction can go on *pari passu* with the treatment; and if children who have had to have sanatorium treatment are not to be hampered mentally as well as possibly physically, a skilled teacher is essential in every children's sanatorium. One who has herself, or himself, been through the training ground of the sanatorium and the discipline of the illness is in many ways an advantage. There are, unfortunately, many such, and to employ one in this way confers a double blessing.

Then, lastly, there is the subject of food, generally in my experience the final objection. Patients can stand everything else, *but* "I could *not* eat such quantities of food. I have such a small appetite. I will do my best, but——" and so on. Now, we know well the wearisome, heartbreaking sight of a child that does not care a straw for its food,

that just plays with it, interested in everything rather than that: such a child will cheerfully take one or two hours over its dinner; but such a procedure is absolutely disorganizing to any ordinary household. The other children have eaten their food, and have gone to their various occupations, and, at the best, the little frail one is left by itself. Usually its plate is taken away almost untouched, and it is abused for being such a naughty child, and for being so tiresome over its food. In a sanatorium, the slow eater, with no appetite, is no stranger; they are nearly all alike, and what one is doing, the rest are mostly doing too. It matters not how long he is over his meals; there is no hurry, and, as it is the main business of the day, at recurring intervals, he gradually falls into his place, and meals become less of a task, and more of a pleasure.

This great problem extends beyond the child and the school; it is a national question, and whatever tends to solve it, forms an important step in the maintaining of that efficiency which enables us to keep our place amongst the foremost nations of the world.

SUGGESTIONS FOR PARENTS AND TEACHERS.

Sensory Training.—"Which is of first importance to the child—the receiving of information or the development of the psychophysical organism? Most statements of educational aims emphasize the latter, but the prevailing practice is based upon the former alternative. Why? It is so easy; those who do not know how to teach are often natural experts in imparting information. It is so satisfying; the lecturer, from the kindergarten teacher to the university professor, can cast the statement of fact in such a lucid and artistic form that he is set all aglow with self-appreciation. The pupils approve of it; the ready-made goods seem attractive, and it is so comfortable to be free from effort and have things done for one. . . ."

By sensory training and the consequent establishment of "right habits of attention, the efficient keenness of the senses may be increased manifold above the now-prevailing average; that these habits, once established, tend to perpetuate themselves and are an inestimable asset of power; that as a result of high efficiency in the power of sensory acquisition the information which is vital to life will come by the way; and that keen perception, the foundation of intelligence, is a condition for true and vital imagery, faithful memory, clear perception, incisive reasoning, and efficient action."—*Dr. C. E. Seashore*, in the *Journal of Educational Psychology* (U.S.A.).

Teaching the Domestic Arts.—"Is science, as the exposition of truth in due order of development, to be used for the purpose of

secondary education; or shall the activity of girls in the laboratory be regulated by inquiry into important and interesting problems arising out of desire to penetrate to the mysteries of diet, cooking, washing, and household cleaning? . . . The main body of opinion among the science teachers [is] that science, as such, *i.e.* in connected sequence, should be studied by all who, with the time and opportunity of secondary education, are capable of understanding it. . . . It is maintained that science cannot be taught with that clearness as to the issues involved and their relations which the average mind requires, if it be taught in the form of a commentary on the complex body of the domestic arts. . . . The best solution is, I believe, the German solution, that the girl should, at the end of the ordinary school-course, take another year either in a special school—the German method—or at the top of the secondary school, as some of us try to solve the problem here."—*Mrs. Bryant, D.Sc., Lit.D.*, on "Science and the Home Arts," *Educational Times*, December, 1912.

Parental Pedagogy.—"The upbringing of children is a very serious matter and upon its successful issue largely depends the future of the race. Unfortunately parenthood is accepted in a very haphazard manner. Indeed, the average individual makes very little better preparation for the offspring than do the lower animals, though they deal with the training of an intelligence. We require a new science, the study of parentage; something between the sublety of psychology and the steely precision of the eugenics of Professor Carl Pearson. Some day, parental pedagogy will be part of the curriculum in schools."—*A. H. Gerrard, M.D.*, on "Infancy, Childhood, and Adolescence," in *The Parents' Review*, October, 1912.

NOTES.

Our Journal.—After very careful and anxious consideration by the Journal Committee, and a reference of the matter to each branch, it has been decided to make certain alterations with regard to the publication of our journal. These changes have been approved by a decisive majority of the branches, and by a very large majority so far as the actual subscribers are represented. In future the journal will appear eight times a year, that is, each month excepting January, July, August, and September. It will be seen that the months omitted are those during which most of the subscribers will be taking their holidays.

The familiar, and we hope welcome, outward appearance (cover) will remain unaltered, but there will be some changes—not finally settled yet—in the internal arrangements. The price is to be reduced to threepence per issue, so that the annual subscription remains the same, and it is hoped that the postage will not be more than a halfpenny, and hence the total cost will be unchanged. Each number will, of course, have somewhat less in contents—at least for the present—than formerly, but the total amount of matter during the year will be very much greater than hitherto.

The chief advantages which will arise from the changes will be: the members will

have the opportunity of getting a larger number of the valuable and important papers read at our meetings ; the papers will be published immediately or not long after they are given, and before other journals have already published them ; meetings and current events can be dealt with in time to be of much greater use to the readers ; it will be possible to introduce additional features, and, generally, the journal will be in many ways more valuable and useful to the subscribers, and more worthy of the society.

The new order of things will come into force in February. The Journal Committee feel confident that they can continue to rely upon the loyalty, goodwill, and generous assistance of the honorary secretaries of the branches, upon whom much depends ; and they also ask individual members to do all they can to increase the sale of the journal by introducing it to their friends, and getting booksellers, etc., to show it.

The Welfare of Infancy.—A new society called *The National Association for the Prevention of Infant Mortality and for the Welfare of Infancy* has recently been formed by an alliance between the National Conferences on Infant Mortality, the National League for Physical Education and Improvement, the Association of Infant Consultations and Schools for Mothers, and the Women's National Health Association of Ireland. Mr. John Burns is the president of the association, and Sir Thomas Barlow the chairman of the executive committee. The new society has already arranged to hold a post-graduate course on the feeding and care of infants, in London from January 6th to the 16th. It is also engaged in organizing an English-speaking Conference on Infant Mortality, to be held in London on August 4th and 5th next, a date which immediately precedes the International Medical Conference. In addition to expert authorities in England, delegates from overseas dominions and America will take part in this conference. The secretary of the association is Miss Halford, 5, Tavistock Square, London, W.C.

"Education."—We are asked to announce that this weekly journal will in future be sold at a penny per week instead of threepence ; or post free for a year *6s. 6d.* There will be no reduction in the size of the paper. The price has been reduced to meet the views of teachers and others who cannot afford a threepenny paper.

Our Next Conference.—As mentioned in our last number, this is to be held at Liverpool on May 22, 23, and 24. The subject is "Child-Study as a Link between the Home and the School." We are glad to be able to announce that Mrs. Mumford, Professor Campagnac, and Dr. Leslie M'Kenzie have promised to read papers.

Our President.—At the unanimous request of the Council Sir James Crichton-Browne has again consented to honour us by being our president for another year. He will give the annual presidential address at the Liverpool conference.

Our Library.—Mr. Macleod Yearsley, F.R.C.S., has presented the following books to the library : *The Child's Mind*, W. E. Urwick ; *An Introduction to Child Study*, Dr. W. B. Drummond ; *The Health of the School Child*, Dr. W. L. Mackenzie ; *Adenoids, Cases of Acquired Deaf-Mutism due to Congenital Syphilis, The Treatment of Ears in School Children, The Education of the Deaf, The Causes leading to Educational Deafness, The Prevention of Deafness, An Investigation into the Occurrence of Adenoids, The Classification of Deaf Children*, M. Yearsley ; and *The Criminal Mind*, Dr. M. de Fleury. " W. Sharman " has presented *Organization at Hazlewood School.* Dr. G. E. Shuttleworth has presented *Mentally Deficient Children.*

London Society's Lectures.—The first lecture next year will be given by Dr. James Kerr, M.A., on February 13 : subject *Brain Mechanism and Handwriting.* The second will be by Dr. A. Wilson, on February 27 : subject *The Development of the Child's Brain.*

CORRESPONDENCE.—Sexual Hygiene.

Sir,—Having read Dr. Pritchard's admirable paper on the teaching of Sexual Hygiene, may I offer the following remarks from my own practical experience? First, although I have four sons of my own and teach them myself, Dr. Pritchard is perfectly right in saying that, as a rule, parents are not the best people to teach these matters to their own children. They are too self-conscious or too sentimental, their own attitude to the subject is not natural. This is indeed the whole difficulty—the absence of a natural attitude in those who teach; but I disagree completely with Dr. Pritchard when he says "there does not seem any pressing hurry to reach the lower levels of childhood." It is exactly in the lower levels of childhood that a natural attitude must have its foundation laid. You must begin at 3 years old, to secure a natural attitude by means of the child's interest in the bees and flowers and the work of the pollen, and by means of perfect frankness in face of the child's close reasoning and analogy from this onwards. Reverence for life and all its processes is your only chance of securing self-reverence later. The sexual purity of the Irish can be easily explained by the very natural attitude of the Irish mothers, this again points to the importance of the lower levels of childhood. Mothers may not be able to give lessons on sex hygiene, but we never must forget "that education is an atmosphere." On that atmosphere depends the creation of the natural attitude on which alone purity can be safely based. That atmosphere can only be created by wise motherhood or by that wonderful system of Dr. Maria Montessori, which gives the lens of science to the eyes of motherhood, and allows the motherhood so aided to cover the homeless little ones of slums and cities. But she must reach the lower levels of childhood, and insist on gathering the little ones from 4 to 7 years old.

T. L. Frere.

REVIEWS.

The Sexual Life of the Child. By Albert Moll, M.D., translated by Dr. Eden Paul. George Allen & Co.

The work of Von Krafft-Ebing on the psychopathics of sex combined with the writings of Havelock Ellis on its sociological and philosophical aspects has done more to rescue the whole problem of sex from its position of unmerited obscurity and suspicion than the efforts of all other authors combined. Some few years ago Professor Freud, of Vienna, startled an unprepared world by his claim that many of the hysterical and neurotic manifestations of later life, in both men and women, found their explanation in some of the little understood sexual incidents of early childhood. Although Professor Freud's views have not found general acceptance, thanks to his courage and to his great powers of exposition, the whole subject of the sexual life of the child has been submitted to the closest investigation, and the fact of its predominating influence has been amply confirmed. No man has studied the aspects of the sexual life of the child more thoroughly than Professor Moll, and he has incorporated his experiences in a book of some magnitude. This work has been translated into English, and most excellently translated, by Dr. Eden Paul, and it is now offered to the notice of members of the medical, scholastic, legal, and clerical professions, to whom alone the publishers have determined to sell it. We believe this book will subserve a very useful *rôle*, for we can conceive of no knowledge with respect to childhood that can be of greater importance than the kind of knowledge which is inscribed on every page of this work. Von Krafft-Ebing's views were too pathological, Freud's teaching is too psychological, and Havelock Ellis's too general for particular application. Moll seems to have struck a happy mean, and to have written as much down

to the level of the unscientific pedagogue, as he has written up to the level of the psychologist with pedagogic interests. Moll's chief method has been the investigation of the normal, he has kept normal children under observation, and has taken the personal records of a large number of normal adult individuals. Most grown persons can recollect some striking sexual incident which made a strong impression on the processes of mind at a time when the sexual instinct was still undifferentiated. Moll has taken a number of such records from various sources and has pieced them together in such a way as to make a fairly intelligible whole. Making full allowance for the inaccuracies of memory, and the want of proportion which this method of anamnesis encourages, it is clear that this line of inquiry, when checked and supplemented by the method of direct observation, affords most valuable information of the heretofore little suspected existence of the child's sexual life. Each method of inquiry has its defects, for by the time children have become conscious, no matter how imperfectly, of the existence of this great motive force, and have acquired a sufficient command of language to express their subjective feelings, they are usually so overcome with bashfulness and false shame that they are entirely uncommunicative—and long before this time they are very quick to detect any close scrutiny of their actions. Both the physician and the educationist have countless opportunities for observing the strange manner in which the subjective erotism of children is manifested in their outward behaviour, but it is necessary first to know for what to look, and necessary in the second place, to interpret correctly that which is observed, for it is very easy to exaggerate the importance of such manifestation, and very easy to misinterpret their significance. If Moll's investigation prove nothing else, they certainly prove that the normal child is strongly actuated by sexual impulses which at first are quite undifferentiated and often incestuous. The importance of these instincts can scarcely be exaggerated from the medico-legal point of view. Sexual perversion and sexual precocities are often due to a misunderstanding or to a misdirection of these early manifestations of the sexual instinct. There can be no doubt that many a tragedy might have been avoided in the past had the various phases of the sexual life in children been better understood. Now that Professor Moll has lifted the veil from a side of life which has been too much neglected, it can be only hoped that in the methods of the nursery and of the school full advantage will be taken of that knowledge which is so clearly set forth in the pages of this invaluable work.

The Elements of Child-Protection. By Dr. SIGMUND ENGEL, translated by Dr. EDEN PAUL. George Allen & Co. Pp. 276. 15*s.* net.

In his preface the author says: "This book is an investigation of all the problems involved by child-protection from the standpoints of the modern socialist movement and of modern social science. . . . My aim has rather been to effect a lucid presentation of all the problems of child-protection, than to attempt myself to supply the solution of all these problems." The contents cover these topics: *General Part:* some problems of population; child mortality; quality of population—artificial selection (eugenics) and education; pros and cons of child-protection; executive instruments thereof. *Department of Civil Law and Individual Rights:* marriage and parental authority; marriage and heredity; protection of illegitimate children; limited powers of minors, and guardianship. *Department of Local Administrative Activity:* child-protection as to birth; infant-life protection; care of foundlings, wet-nursing, and baby-farming; women's labour and child-labour; protection of children against disease; the public elementary school. *Department of Criminal Law:* criminality in youth; penal methods; prostitution; punishable offences against children.

It will be seen that a very wide area is covered. As far as we can judge, this has been very ably and helpfully done. Parents, teachers, and social workers, who wish

to get a grasp of the general social relations of the child, will find competent and comprehensive guidance here.

Citizens in the Making. By F. J. Billiarde, B.A., Superintendent of Neglected Children, Province of Manitoba. Pp. 148.

This is the superintendents' annual report for 1912, and is officially addressed to the Hon. J. H. Howden, K.C., Attorney-General, Manitoba, while publicly addressed to "social workers, probation officers, clergymen, civic officials, and others," who have made "so many inquiries" of the author. It deals with the detention home, truant school, children's hospital, fresh-air camp, juvenile court, probation, children's playground, slum child, causes of delinquency, etc. There is much that should prove interesting and suggestive to all who have to do with such matters. The writer is obviously a devoted enthusiast in his work, and his strong feelings lead him sometimes to indulge in sensational writing, and at other's cause him to break forth into verse. The section on "Children's Playgrounds" is especially good. The report is fully illustrated with excellent photographs.

The Diary of a Free Kindergarten. By Lileen Hardy. Gay & Hancock, Ltd. Pp. 175. 3*s.* 6*d.* net.

Miss Hardy has written a charming diary account of a splendid piece of social and educational work in an Edinburgh slum. We envy her the many delightful experiences she has had, and the fine results of her efforts. The clergy, parents, and social workers may all learn much from this narrative, while all teachers of the young should find in it as much profit as delight. Here is a very suggestive statement of the aim of a Free Kindergarten: "The kindergartner's aim is not to give instruction, but to supply such appropriate environment, stimulus, and protection, that the child's inherent capacities, like a seed, will naturally unfold into harmonious development, into such a pure and perfect whole as a flower naturally becomes in the hands of a skilled gardener." The book is full of practical educational guidance on nearly every phase of infants' education on the most modern lines.

The book is full of the adventures, crises, and triumphs of the work; it has many naïve revelations of child and adult nature; and is, indeed, a real romance of educational life. The style is literary and unusually attractive—a pleasure to read. We wish it the success it deserves. Only one thing we should like to suggest to all teachers of infants who read this book: that they should study seriously and extensively the psychology of religion. Has it ever struck them that, without such study, they may be systematically preparing the little ones, to whom they so ungrudgingly and unsparingly devote themselves, for irreligion? Let them ask this of the psychology of religion.

The Life of Christ. By Rev. F. M. Blakiston, M.A. Pp. 370. 2*s.* 6*d.* net.

Builders of the Church and Prayer Book. By Miss K. L. M. Rowton. Pp. 324. 2*s.* net.

The Church's Year in the Sunday Kindergarten. By Sibyl Longman. Pp. 314. 2*s.* net. National Society's Depository.

The first of the above three books is a series of lessons for older scholars (14 years and upwards). It is on the old-fashioned, informational, and hortatory lines, and has but little to recommend it. The second book will prove helpful to any teacher who believes that an *olla-podrida* of history, ritual, religion, etc., is of real educational and spiritual value to boys and girls (aged from 11 to 14 years). The third book contains lessons for children from 5 to 8 years of age. These are modelled on what are known as New Methods for Sunday Schools, and will be both interesting and useful to teachers who are trying such methods. Such volumes as these make one sadly realize

how much there is to do in spreading a knowledge of child psychology, and the vital importance of the study of the psychology of religion by those who teach religion.

Teachers and Taught, a Monthly Magazine. Headley Brothers. Pp. 16. 1*d.* monthly, 1*s.* 6*d.* per ann., post free. Friends First-day School Association.

This claims to be "the only periodical devoted to the interests of Religious Education in this country that has six distinct grades of lessons; these, as will be seen, are planned to meet the requirements of the main natural divisions of childhood from infancy up to early adolescence." We must emphatically refuse to admit the latter part of this claim, for the lessons appear to us to violate all we know of child-psychology. Infants of the "ages 4 and 5 years" have nothing to do with the "underlying thought—Those who love God help each other," as shown by "Elisha in Shunem"; nor are they ready to begin the study of "Fallen Leaves and Earth-worms," etc. The lessons for "children aged 6, 7, and 8" are, in our opinion, equally mistaken and mischievous. The compilers show skill in the handling of reference books from the adult point of view, but—if we know anything of it—a lamentable lack of knowledge of child nature. The lessons "for ages 9, 10, 11, and 12" are much nearer to childish interests and understandings. As for those "for ages 13 and over," we should like to examine a class of adults to whom they had been given. We write these criticisms in sorrow that such good intentions should, as we think, lead to such bad practices. We earnestly commend to the consideration of the writers these words of Professor William James: "I think I have seen college students for ever unfitted for philosophy from having taken that subject up a year too soon" (*Talks to Teachers*).

Publications Received.—*The Journal of Education; The Educational Times; The Journal of Educational Psychology* (U.S.A.); *Educational Review* (U.S.A.); *L'Education Familiale; The Woman Teacher; The Woman Teacher's Magazine; Moral Education League Quarterly; The Training School; La Revue Psychologique; L'Année Pédagogique; The Parents' Review; La Escuela Cubana; Child Life; The National Temperance Quarterly.*

Pauline's First Reading Book, pp. 141, 1*s.* 6*d.*, Longmans; seventh annual report of *The National League for Physical Education and Improvement;* fourteenth annual report of *The Children's Committee, Metropolitan Asylums Board; The Diner's Out Vade-Mecum*, Alfred H. Miles, pp. 224, 1*s.* 6*d.* net, Stanley Paul & Co.; first annual report of *The National Bureau for Promoting the General Welfare of the Deaf;* third annual report of *The American School Peace League; The Life and Teaching of Jesus*, Gospel readings for Children, E. E. Read Mumford, M.A., pp. 160, 1*s.* 6*d.* net, Longmans; *A Short History of Todmorden*, Joshua Holden, M.A., pp. 242, 2*s.* net, Sherratt & Hughes; *Pictures and Illustrations for the Teacher*, National Society's Depository; sixteenth annual report of *National Association for the Feeble-Minded; The Everyday Savoury Book*, Marie Worth, pp. 120, 1*s.* net, Stanley Paul & Co.

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Edited by H. HOLMAN, M.A.

Formerly Professor of Education at the University College of Wales, Aberystwyth, and one of His Majesty's Inspectors of Schools.

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